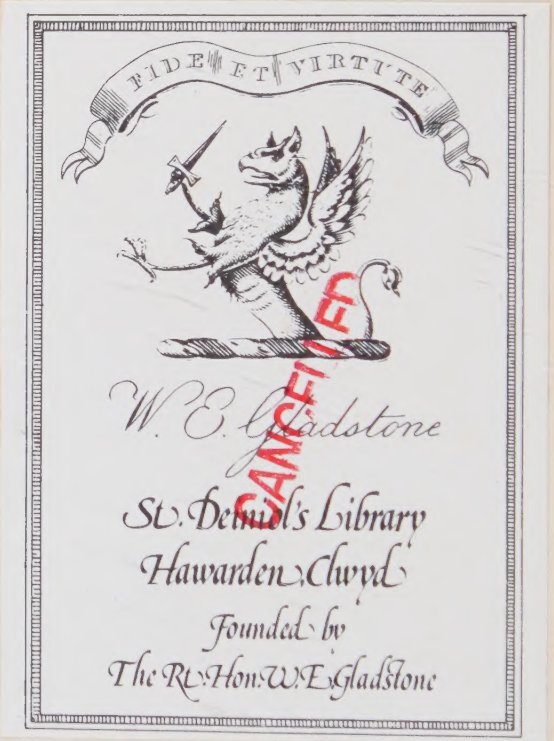
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THE PROBLEM OF CREATION

THE PROBLEM OF CREATION

AN ATTEMPT TO DEFINE THE CHARACTER AND TREND OF THE COSMIC PROCESS

BY

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SOCIETY FOR PROMOTING CHRISTIAN KNOWLEDGE
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PREFACE

By way of preface, I would draw attention to the limits I have imposed on myself in this attempt to grapple with the Problem of Creation, and to arrive at conclusions which may help to solve it.

My argument is chiefly based on the postulate *ex nihilo nihil*—a postulate accepted by common sense, by science, and by most philosophy. (To certain thinkers who deny it I devote some special sections.) I take, as a master-key to the working of the cosmic process, the main principles brought to light by the evolution hypothesis—principles now accepted, not only by the vast majority of scientists and philosophers, but even by representative teachers of the Roman Catholic Church.

Having vindicated these premisses, I ask what are the implications of the facts of experience when these are taken as directly as possible and in their entirety; and I contend that, if we are to be loyal to *ex nihilo nihil*, we must find for them an ultimate Ground which shall be at least adequate to them, however much it may transcend them; and that to this extent, at any rate, the Ground is not an Unknown or an Unconditioned. All Being and Becoming that fall within our experience must have in the Ground their Sufficient Reason, and therefore be a manifestation of the Nature of that Ground.

On the physical side, we have the " material " universe, imposing itself on our attention by our experience of what we call *Force* or *Energy*. The forces operate in certain determinate modes and give rise to a definite cosmic process. But we find that, apart from our sense of putting forth effort, we could not so much as form the concept of Force, and therefore not of Causation. We are thus driven on to recognize the significance of the fact of Will. This, again, we know is often accompanied by Consciousness and directed by rational Purpose. I show that we can trace Will, Consciousness, Purpose, and Reason, in the Cosmos at large, and that the world external to ourselves is essentially akin to the most fundamental of our own experiences. Applying the postulate *ex nihilo nihil*, we conclude that the Ground must be a conscious, purposeful, rational Will.

Advancing into the spheres of the Beautiful and the Good, we gain a natural transition to the facts of Individuality and of Self-consciousness, culminating in that of Personality. Here, also, just as cogently as in the former set of facts, we are compelled to discover an adequate Ground, and we conclude that the ultimate purposeful Will must be a Self—a Person—in at least such a sense as will give a Sufficient Reason for the crowning facts in our own experience. *Ex nihilo nihil* asserts itself even more authoritatively as we rise in the scale of Being and Becoming; for the process must be judged by its endings, not by its beginnings.

Such, in bare outline, is the main course of my

argument. In following it out I have, of course, been led to deal with many subsidiary problems, such as those of Necessity, Law, Free Will, and, more especially, physical and moral Evil. But I have kept in all cases as closely as I could to the facts of experience and the inferences which may be more naturally and immediately drawn from them.

As regards Science, I have given full weight to its teachings, and have accepted many of its latest hypotheses concerning the constitution of Matter. Indeed it is in these recent discoveries that I find much material for establishing my chief thesis. A certain amount of metaphysics was inevitable. But I have studiously avoided "pure" concepts and transcendental subtleties. For the purpose in hand I have somewhat maintained the pragmatist's attitude.

I am to keep as far as may be to the direct deliverances of experience. I am therefore precluded from incorporating into my argument materials derived from revelation or ecclesiastical authority. I would ask my readers (and critics!) to bear in mind this limitation when they do not find mention of many subjects which they may deem vital to their own theological position. The existence of religion itself, however, is a solid fact; so is the life and work of Our Lord Jesus Christ; so is the historical development of the Church—these will receive due attention from my special point of view. Moreover I shall cite the teachings of certain great ecclesiastical thinkers, ancient and modern, inasmuch as

they are essential to a grasp of the problem which they have done so much to define and to illuminate.

I have not encumbered my pages with references. I would make a general acknowledgment of indebtedness to many writers—not least, as concerns ancient and mediæval speculation, to the articles on Creation and kindred subjects in the splendidly comprehensive "Catholic Dictionary of Religion and Philosophy."

The Table of Contents is so framed as to show, in ascending order, the various classes of "facts" demanding recognition if our world-view is to be adequate to the rich complexity of the world-process—that process which already reveals its inmost nature by the development of Persons, and which gives promise of an all-inclusive consummation destined to unite these Persons in a perfect society, with God as its unifying and sustaining Centre.

J. EDWARD MERCER

September 5, 1917

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FROM GOETHE'S PROŒMIUM TO "GOTT UND WELT"

(Trans. by Symonds)

What were the God who sat outside to scan
The spheres that 'neath His fingers circling ran?
God dwells within and moves the world and moulds,
Himself and Nature in one form enfolds;
Thus all that lives in Him, and breathes, and is,
Shall ne'er His puissance, ne'er His spirit miss.

PART I
FUNDAMENTAL CONCEPTS

CHAPTER I
INTRODUCTORY

MAN, just because he is man, finds himself driven to speculate concerning his origin, his nature, and his destiny. He does not simply exist: he is "a being breathing thoughtful breath," and asks Why?—How?—Whence?—Whither? The demand for a systematized cosmology springs from his intellectual activities; the driving force in the struggle to gain such a cosmology is supplied by feeling and emotion, by moral ideals and by spiritual aspirations. The untutored savage is impelled to body forth his crude speculations in fantastic myths. The trained agnostic, spite of negations, is here, in his heart of hearts, at one with the philosopher who, undaunted by failure, hopefully launches his boat on these shoreless seas. In short, the craving to read the open secret is as old as human thought and will endure through the ages yet to be.

Our concern is with the problem of creation. Too frequently this problem has been taken as almost synonymous with that of "origins," but the increase of knowledge shows us with gathering clearness that it cannot be thus restricted in its scope. For beginnings, it is seen, are organically connected with endings, and imply an intermediate process. Our universe is not a ready-made system which merely works on like a

machine, but is a universe in the making which manifests development and growth—it is the scene of continuous creation. And thus it comes about that modern cosmologists are realizing the complexity, as well as the profundity, of the questions which claim their attention; they have to take account of every side of experience; they have to reckon, not only with matter and motion, but with new conceptions in science, with art and philosophy, with ethics and religion, with history in its widest sense. For the present has grown out of the past, and is giving birth to the future. Creative activity is manifested throughout.

MY AIM DEFINED

It would be obviously impossible for any man, however encyclopædic, to grapple with such a problem in all its magnitude and its detail. My own aim is a modest one. I shall try to bring out, in broad but firm outline, the main features of a cosmology that reckons with the results of modern science and modern speculation. I shall as far as possible avoid metaphysical abstractions and theological assumptions, and shall strive, dispassionately but doggedly, to keep in touch with the facts of experience and with the inferences which they most naturally and immediately suggest. If such a method does not probe the "ultimates," it may at any rate provide a basis for a pragmatistic world-view which shall not be out of harmony with reason and knowledge, and which may furnish foundation-material for more ambitious structures.

My appeal is to the facts of experience in what I may call their primary import—not dissected and devitalized by materialistic science, nor defecated to transparencies by absolutist idealisms, but taken in their living fullness and with their human values. The lower planes of existence will not be forgotten, but they will be kept in

due subordination to the higher. If we would see life steadily, we must also see it whole.

The facts of experience—how endlessly manifold they are! Cosmology too often restricts itself to the universe perceived by the senses and studied by scientific methods. But besides matter, motion, force, and the like, we have consciousness and reason, the æsthetic faculty, the moral sense, and the religious sentiments. These are every whit as much "facts" as the material aspects of the universe. Again, we have not only to study physical movement, but life—not merely mechanical functions, but the strivings of centres of the will-to-live, culminating in the emergence of self-conscious Personalities, who find their highest satisfaction in and through the will-to-love.

EVOLUTION A MASTER-KEY

At the outset I would declare my conviction that the evolution hypothesis, taken in its main sweep and apart from shifting detail, furnishes a master-key for understanding the How of the cosmic process. The time is happily passed when the adoption of this hypothesis laid a thinker open to the severe suspicion, if not the denunciation, of those who imagined themselves to be upholding a final dogma of revelation. Even Roman Catholic theologians (see chap. vi) have made provision for incorporating the principles of evolution into their rigidly ordered system, and are discovering anticipations of them in the writings of their early authorities.

DEMONSTRATION NOT POSSIBLE

In grappling with the problem of creation, it may be well to acknowledge at once that demonstration, in the strict sense of the term, is out of our reach. At various times there have been men who have deemed that they had "proved" God's existence and His creatorship.

We recall especially the famous triad—the cosmological proof, the teleological, and the ontological. As I am eschewing pure metaphysics I shall not dwell upon these. I would only say that they have come to be generally regarded as analyses of beliefs rather than as demonstrations of the substance of those beliefs. They retain a place of their own, however, in the Theistic arsenal; for they have never been definitely controverted.

It may be thought by some that if study of the creation problem does not result in demonstration, any conclusions reached cannot claim serious recognition. But, reasoning thus, they would be in danger of grievous error—unless they desire to yield themselves victims to a nihilistic agnosticism. For all scientists and philosophers, nay, all mathematicians, are in just the same plight where their ultimates are concerned (see Appendix A). Sacrilegious hands are being laid on their most firmly established postulates. The Euclidean geometry is no longer thought to be necessarily the only geometry applicable to space. Other systems are developed for which it is not true that a straight line is the shortest distance between two points; or that the three angles of a triangle are equal to two right angles; that parallels do not meet, and so on. Mill and others have suggested that there may be worlds in which two and two may not make four. If such is the case with mathematics, the most secure of all departments of human knowledge, we may surmise that other departments are in yet worse straits. Even that most steadfast pillar of the temple of science, the doctrine of the conservation of energy, is assailed (see Appendix D). The indestructible atom is deceased; the supposed universality and invariability of the so-called laws of nature are shown to be dependent on acts of scientific faith. Laplace held the theory of gravitation to be final, and was convinced that, by its aid, the secrets of cosmic development could be com-

pletely explained. His confidence was vain—we are only on the confines of the problem. A recent theory (1915), that of Einstein, claims to have some prospect of finality. Its author reached it as the culmination of a long series of theories rendered necessary by the development of electrical theory and research into the ultimate structure of matter. The basis of this new speculation, the theory of relativity, is itself full of startling developments. For example, one form of this theory postulates the possibility of instants, t_1 and t_2, referring to events taking place at different points of space, being neither coincident with, nor before, nor after one another.*

These theories of relativity, it may be observed, have arisen from a new sort of postulate—that there is no velocity in nature greater than that of light. But this postulate is gravely questioned by eminent mathematicians, and, in any case, is an undemonstrated assumption.

Theories of the ether, the electrons, and the rest, are still more obviously unable to claim demonstration: they have opened out to us marvellous vistas, but they are tentative assumptions. So also with the speculation that all the forces of nature may be differentiations of one fundamental reality—Energy. For myself, I have accepted this speculation, and I make use of it in what follows. But here and everywhere we are only feeling our way to larger generalizations in our efforts to win wider horizons. We are justified in rejoicing at our progress; but we are foolish if we assert that we have attained to final demonstrations. In all inquiries alike we are reduced at last to working hypotheses, and can only hope to secure such a measure of unity and coherence among these hypotheses as to warrant a reasonable faith.

The scientist, then, who objects to conclusions which cannot be demonstrated, in the strict sense of the term,

* Cf. Rolls' "Time and Space."

lives in a house of glass; he makes a demand which he cannot meet himself. I say this, not to score a point over him—nothing could be further from my thoughts—I merely ask him to reckon with the limitations of our reasoning powers and of our data, and to realize that he can no more escape them than can the philosopher or the theologian.

Credo ut intelligam. This receptive attitude is not, in certain cases, so indefensible as some may imagine. It is not, however, on such a submission that I now rely, but rather on what Kant called "the practical reason." That is to say, I shall try to arrive at conclusions which, while not to be formulated in exact syllogisms, may yet be sufficient to determine a man's attitude to the facts of existence, to give direction to his conduct, and to inspire hope for the fulfilment of his ideals. Life is, and ever will be, greater and richer than human knowledge. Our deeper convictions must ever rest on foundations that science can never reach. Very significant is a pronouncement of Herbert Spencer. At the close of his wonderfully strenuous life, when the toilsome compilation of his synthetic philosophy was a thing of his past, he affirmed that he held feeling, not intellect, to have been the dominating factor in evolution.* We may, or may not, agree with him, but at least we must accord to feeling a mighty influence in making us what we are.

THE RÔLE OF SCIENCE

Advance in science is, of course, essential to advance in cosmology. Science supplies us with fresh arrays of facts on which the intellect can go to work and to which feeling can attach values.

Modern astronomy, for example, reveals to us a universe compared with which that of mediævalism, with its three stages, is the veriest baby-house. It

* "Facts and Comments," pp. 25 ff.

proves to us that our planet is but the tiniest speck in a limitless expanse of systems and galaxies and nebulæ. It leads us through fathomless abysses of space and time. And what is the result? Our intellects are grappling with problems of corresponding sublimity. We are indefinitely enlarging our conceptions of the potentialities of existence. Cosmic emotion takes a vaster range and vibrates with a deeper tone. Religious values are heightened and transformed in proportion as our conceptions of the Source of all existence are exalted.

The marvels of astronomy are on the scale of the inconceivably great. Science has opened out to us the even more marvellous phenomena of the inconceivably small. The atom is shown to be a complex system of particles moving at speeds which are only comparable to that of light. This increase of knowledge is already reacting on our emotions and will, and will react still more as the facts are better established and assimilated.

FEELING AND INTELLECT

And so throughout. Feeling and intellect are indissolubly connected, and develop keener longing to pierce to the heart of mysteries which, set in the framework of cosmic power and splendour, are fraught for us with living issues. "More light—more light," cried Goethe in his dying moments. Yes, we crave for more light. And if we are to gain it, we must not shut off any source from which it may stream.

We hail with deep satisfaction the present tendency among scientists to a sober reserve, to a more reflective realization of what is beyond their reach. The dogmatism of earlier days is yielding place to a recognition of those subtler factors in our experience which defy apparatus and formulæ. Let us note that this change has been wrought largely by that very increase of the knowledge which was supposed to justify the dogmatism.

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It is a proof of the indissolubility of intellect and emotion—a modification of mood and attitude resulting from a fuller supply of data. As a consequence, we find that scientists are more ready to welcome any honest attempt to harmonize their discoveries with the promptings and cravings that well up from the deeps of our composite being.

Is it too much to expect that philosophers and theologians shall be at least as modest and receptive? If belief in the unity of existence is genuine and practical, it must carry with it a readiness to find a place for "new knowledge." Scientists are expanding their views without disloyalty to their fundamental principles. Shall it not be possible so to conceive of cosmology that, while loyal to the fundamentals of metaphysics and theology, we shall keep in living and continuous touch with every noteworthy product of human research and speculation?

CHAPTER II

DEVELOPMENT OF COSMOLOGICAL IDEAS

It will be well to preface more systematic study of our materials by a brief quasi-historical survey of the most significant ideas which have emerged in the various stages and forms of cosmological speculation. Schools of thought are only too apt to stereotype certain traditions and dogmas, and so to narrow the outlook of those who subscribe to their respective teachings. Let us guard against this danger by realizing at the outset how varied and many-sided have been the attempts to solve the problem of creation.

THE TERM "CREATION"

And first as to the term "creation." Two main meanings are distinguished. It may mean the activity which creates, or it may mean the product of such activity. To use an illustration which will be advanced subsequently: an artist creates first by setting his æsthetic imagination to work, and then by embodying his imaginings in concrete form through the mediums of canvas and colours. This double meaning is retained when we think of creation in its fullest sense as applied to the universe at large: there is the creative activity of the Supreme Power, and there is the universe which is the objective manifestation of that activity. In each case the underlying idea is the same—the Becoming of something which, apart from the exercise of creative activity, would not exist.

Let it be noted that the product of creative activity

need not always be material. Even in ordinary speech we can say that one person creates an "impression" on the mind of another—that is, creates a result in the sphere of the psychical, or spiritual. This remark may appear too obvious. But does it not often happen that controversy about creation turns predominantly, if not exclusively, on the materialistic aspects of the universe, to the neglect of the psychical and spiritual aspects? It is against this one-sidedness that I definitely protest; for I hold it to be fatal to the attaining of an adequate cosmology. Matter, even though we take an idealistic or spiritual view of its nature, and high as we may rate its dignity, is nevertheless but one factor in a marvellously composite whole. And that factor, moreover, is on the lowest plane of Being; it serves as basis for modes of Being which are of indefinitely greater subtlety and significance than itself.

COSMOLOGY IN MYTHS

The earliest cosmogonies are found in the myths of primitive peoples. Most of these are crude and fantastic, but often deeply suggestive. They are numerous, and varied in detail; nevertheless there is a strong similarity in their governing ideas, certain of which, in refined forms, continue to have their place in advanced philosophies.

The earliest myths are so naïve that they do not rise above the conception that the divine Being (or Beings) "makes" the world as men make their houses, weapons, and implements. An echo of them is found in St. Paul's figure of the clay and the potter. Clearly there is in such immature embodying of vague speculation a presupposition that the material used existed before it was put to use. As the scale of civilization rises, the crude anthropomorphisms of such myths were toned down, but the presupposition remained, and forms a constituent

part of advanced cosmologies. The Biblical writers never definitely discarded it.

Another large group of myths, of which the Greek is the best known member, developed the figure of " birth " rather than that of " making." In Homer, for example, Oceanus is the father of all the gods, and Tethys (Earth) the suckling mother. That is to say, the great nature powers are pictured as generating what comes below and after them. Behind them is the awful figure of Night, who is supreme, and whom even Zeus fears to offend—a kind of anticipation of the modern concept of the eternal and inevitable sway of the laws of nature. A transition to philosophical concepts may be found in Hesiod, who takes as his starting-point Chaos (gaping, yawning), by which he probably intended the abysses of space.

EARLY PHILOSOPHICAL DEVELOPMENTS

In primitive mythology, then, we discover two main modes of conceiving the beginning of the world—the one, that of making out of pre-existing material; the other, that of generation. Were these conceptions, stripped of their crudities, able to maintain themselves when submitted to the criticism of more systematic thought ?

Naturally we first turn, in answering this question, to the fathers of Western philosophy, the famous Ionian school. Throughout their speculations we can trace a common characteristic, by virtue of which they have been called physicists. They all started with some sort of substance as the primitive mother-stuff : one selected water, another air, another fire, and so on, as the fundamental material or first principle. The favoured element, whichever it might be, was supposed to undergo various changes, compositions and decompositions, taking the forms of gas, liquid, or solid, in accordance with its

inherent powers and tendencies. But we must not therefore regard these daring speculators as materialists properly so called. For they conceived of the primitive mother-stuff as containing life, if not as being actually alive. They thus to some extent adopted both the main conceptions developed in the myths, while profoundly modifying them. There is the primitive pre-existing material, and there is the birth, as it were, of new forms in the actualizing of potentialities inherent in the mother-stuff. One of these philosophers, Heracleitus, introduced a factor of first importance by maintaining that his first principle, Fire, was guided by reason—perhaps the earliest form of the Logos doctrine.

The vein of speculation thus opened was speedily explored with startling subtlety and freedom by thinkers of very varied types. We find Anaxagoras, for instance, laying still greater stress on the rôle of reason, and Empedocles shaking himself clear of physical causes by positing as his first principles the distinctly psychic agents, love and discord. On the other hand, Democritus affirms the purely physical conception, and posits his eternally existing and blindly clashing atoms—so laying the foundation of a theory which, brilliantly expounded by Lucretius in fervid poetry, has persisted down the centuries, and which has only received its mortal wound through the discoveries of the present generation.

So far we see, broadly speaking, a development of the concept of generation, with a deep cleavage between spiritualistic and materialistic tendencies. When we come to Plato, vast strides are made in clarifying and defining the issues. Profound spiritualist as he is, he inclines to the conception of "making." The early theories were what we should now call monistic; Plato is a dualist.* Just because he was so convinced a

* See Gomperz, "Greek Thinkers," vol. iii. pp. 202 ff.

spiritualist he could not bring himself to think that matter had its origin in God. He therefore conceived of it as having an independent existence—formless, chaotic, essentially irrational. Because of its intractability it grievously resists and impedes the Divine purpose. God does, indeed, endow it with various forms and qualities which partly subdue its stubbornness, but it remains to the end an alien power, Necessity—the source of the evil in the universe. This doctrine of matter has exercised an enormous influence on Western speculation, and has moulded much of Christian thought and practice.

But in stating that Plato recurs to the idea of "making," an important reservation must be mentioned. If God is to be pure thought, how could He be brought into connexion with the irrational material He had to reduce to order? Some intermediate agency must be found. Plato accordingly resorts to what is a refinement of the generation theory, but sufficiently different from it to rank as a third conception—that of emanation. He assumed that there "emanated" from God, so as to be separate from the absolute purity of His nature, a principle which he called the Soul of the World, which acts in and through the world as through a body. This modification was developed, by Plotinus and the Gnostics, with fantastic complexity. The mode of Becoming intended by emanation was compared to the rays of light, travelling out into space without (as the ancients thought) loss to, or alteration in, the substance of the great luminary. We may parallel this conception with the claim of the Creed which declares the Son to be "Light out of Light" ("φῶς ἐκ φωτός"); but the emanation concept is stripped of its implication of inferiority—the Divine nature is enriched, but unaltered, by a distinction of coequal Persons in the indissoluble Unity.

EASTERN ACOSMISM

There is strong contrast between the concepts of Greek speculation and those evolved by the keen and subtle intellects of Hindu sages. The Greek was a realist and took his world as he found it, however mystical he might wax in trying to explain it. But the Hindu was a mystic without reservation. He lost himself in abstractions, and came to the conclusion that the world is empty appearance—an illusion through and through. Virtually, therefore, he taught Acosmism, inasmuch as he denied the real existence of what appears. Hence, for him, there was no genuine problem of Creation at all. Its place was taken by vain wrestlings with the question as to how the illusion came into being. If the world is nothing, there is no need to seek for its origin. But how comes it that we imagine it is something? The case is hopeless. All we can do, they agreed, is to strive by renunciation to attain to the state of Nirvana —a passionless, unconscious, relationless condition which is practically equivalent to Nothingness, if indeed it is not absolute Nothingness.

This type of doctrine has, with characteristic modifications, reappeared in philosophies like Schopenhauer's and von Hartmann's, whose speculations will incidentally come before us from time to time. For myself, I find it hard to distinguish it from that of the Idealist's Absolute. If an Absolute is that which is out of and beyond all relations, there can be no Creation; for Creation, if it implies anything, implies relations. A Creator cannot be an Absolute, for He must at least be related to that which He creates.

There is another important concept which seems to have been first evolved by these Eastern philosophers—that of creation *ex nihilo*. It was otherwise unknown to the ancient world; it is not found in the cosmogonies

of Babylonia, Egypt, or Greece. As early as the Rig-Veda, however, it was discussed, and was thus expressed: "In the primal age of the gods, Being was born of Non-Being." This concept of *ex nihilo* will form the subject of the next chapter.

HEBREW CONCEPTS

I reserve for fuller treatment the creation doctrines of the Old and New Testaments, limiting myself here to glancing at the ideas which are comparatively peculiar to the Semitic mind. We have a full and strong assertion of creation by a Being Who utters His fiat; Who transcends His creation, though He is present in it throughout. There is, however, no declaration of creating *ex nihilo*: the concept is foreign to the whole range of writers from Genesis onward: probably the issue never presented itself to them. The idea of "making" is to the front, with at least no repudiation of the supposition that some material pre-existed.

A marked feature of Semitic cosmology is the strong emphasis that it lays on the moral factors in experience. "Shall not the Judge of all the earth do right?" All the other factors in the Creation are subordinated to this. Hence it comes that the Semite grapples almost fiercely with the problem of evil; he is exercised by it, not in its metaphysical, but in its intensely practical and personal bearings. He has no solution for it; but he maintains steadily and unquenchably his faith in the ultimate triumph of light over darkness, of good over evil.

Two other ideas in Semitic cosmology call for special mention because of the powerful influence they have exercised on subsequent speculation in the Christian Church. The one is, that the creative act is by fiat—that is to say, is instantaneous; the other is that each such act, though it occurs in an ordered series, is

separable from its companions. The combination of these ideas gives us the doctrine of "special creations," as distinct from that of continuous process, and is chiefly responsible for the strenuous opposition of theologians to the evolution hypothesis.

THEOLOGICAL CONCEPTS

The primitive Church did not evolve any special cosmology. Its chief concern was to connect the current creation doctrine with its belief in the Divinity of its Founder. The idea of a Personality as the source of all things was thus filled with definite content, and at the same time the spiritual conception of the Creator was left intact. The earliest Creeds do not embody this new element in the traditional doctrine, but it found expression in the Nicene Creed, which, after affirming that God is the Maker "of all things visible and invisible," supplements this in a later clause by affirming of the Lord Jesus Christ that it was by Him "all things were made." In this consists the great and central contribution of Christian theology to the growing volume of cosmological conceptions.

It was not long, however, before another problem came to the front. Assuming that God made the world, how did He make it? Theologians felt that His mode of activity must not be judged by human analogies. We men can only shape and arrange things as they are given to us, whereas God is pure activity, free from external constraint, and for Him there can be no need of pre-existing material. Thus came on the scene a doctrine to which I briefly alluded in the last section, that of creation *ex nihilo*. It was generally adopted, but never authorized by the whole Church.

SCIENCE AND COSMOLOGY

I have already acknowledged the enormous value and significance of the scientist's contributions to cosmology.

As in the case of the myths, so here, there is a dominant idea which gives a certain unity to them all. Science has adopted what may be termed the "dynamical" view of the universe, in opposition to the time-honoured view which may be termed the "statical." Until recent days, it was considered a sufficient explanation of anything when it was referred to the direct creative act of a Divine Power acting from outside. In contra-distinction to this, the scientist, *qua* scientist, seeks to explain things by tracing them back to causes acting from within Nature. In the place of determinate and separate events or acts, he puts continuous process. His master-key is continuity. Here is a typical statement at the opening of a treatise by Cope, a learned biologist, who is also a convinced Theist: "The doctrine of evolution may be defined as the teaching which holds that creation has been and is accomplished by the agency of the energies which are intrinsic in the evolving matter, and without the interference of agencies which are external to it. It holds this to be true of the combinations and forms of inorganic nature, and of those of organic nature as well."

The drift of this passage is clear and unmistakable. It asserts universal continuity in the Becoming of the world. It comes, however, from the pen of a pronounced Theist. We thus gather that the doctrine in no way negatives the activity of a Creator. Rather does it, as I shall try to show, lead us to place more confidence in those deeper intuitions which inspire belief in the essentially spiritual nature of the cosmic process as a whole.

SUMMARY

Our review, though slight, has served to distinguish certain leading ideas evolved in the development of cosmological speculation. We see how many-sided the

problem is, and how varied are the speculations to which it has given rise. The Becoming of things is, from early days, conceived under three figures—making, generation, emanation—none of which has ceased to have a place of its own. We have an eternally existing matter conceived as the sole Ground of all things, or as set over against the Creator—as either rational or irrational—as either self-evolving, or as "brute" material to be worked up into a Cosmos. The Creator is conceived as being the one and only original Being (Monotheism), or as existing along with matter (Dualism), or as one of a group of coexisting beings (Pluralism); as equated with His manifestation (Pantheism), or as apart from it (Deism), or as at once immanent and transcendent (Theism); as personal or as impersonal. We have insistence on the postulate *ex nihilo nihil fit*, and affirmation of creation *ex nihilo*. We have instantaneous fiat opposed to process—special creations to evolution.

Of this bewildering crowd of theories, some are obviously mutually destructive, while others are capable of harmonious synthesis. The largest and most satisfactory synthesis can be effected, I hold, by taking as a centre the epoch-making hypothesis of evolution.

CHAPTER III

IN THE BEGINNING

Was there a beginning ? We are face to face with the interminable controversies concerning the nature of Time. Whichever way we answer the question, we have to confess that the conclusions we favour must always be more or less speculative in character. For the problem of an absolute beginning is too great and too mysterious for our finite powers. All that we can do is to weigh the arguments for and against the competing assertions, and decide if we can which answer has most probability. Let it be clear, however, that the difficulty is by no means peculiar to any one world-view, be it Theistic, Pantheistic, Atheistic, or other ; it is common to all alike, and weighs on each with equal pressure and insistence.

The question, then, assumes this form : Which kind or mode of existence can be most reasonably postulated as self-existent ? In other words : Which kind or mode of existence can be regarded as least dependent on an extraneous cause ? I may be allowed to anticipate the course of my argument by assuming that personal activity fulfils these requirements better than impersonal, and, *a fortiori*, better than matter. But let us pursue the subject in somewhat fuller detail.

TIME

Many philosophers, as is well known, deny that Time is an objective reality. They hold it to be a subjective condition of our thinking. For my own part, while I have not too great difficulty in supposing the subjec-

tivity of space, I find it quite impossible to think away Time. Modify as we will our human conception of it, the fact of succession remains. Give what sense we like to the terms "before" and "after," refine upon them as we may with exquisite metaphysical subtlety, the nebula is nevertheless not the planetary system, Saxon England is not the British Empire, the boy is not the man. I can conceive, and am inclined to maintain, that the world which we interpret in terms of space is really spaceless thought existing in spaceless minds; but I find Carlyle's Eternal Now, not only unthinkable, but subversive of thought itself. It is easy to see that the sides and angles of a triangle can be said to be timelessly coexistent. But I can remember that there was a time in my life when I did not consciously apprehend this proposition, and that I came to apprehend it at a certain period in a course of study. And I cannot volatilize those separate and successive experiences into one. The experience of succession is stubborn.

Bergson has come to the conclusion that we must distinguish between Time and Duration. He takes Time to be our experience of succession translated into the form of Space, and contends that without the idea of Space we should be unable to represent to ourselves a succession of events; that we string out, as it were, our successive states on a continuous line. Time thus becomes a symbol of space. But true Duration, he says, is fundamentally different, and is to be found, not in that which continues to exist without changing, but in that which endures by virtue of the very fact that it changes—in that which has life. Our life is therefore pure Duration. It is "a time flow, not measured by some standard in relation to which it may be faster or slower. It is itself an absolute, a flowing that never ceases, never repeats itself, an always present changing and becoming." This speculation is helpful, though it

may not be final, and may possibly serve to modify extreme views. At any rate it leaves us with objective change as an ultimate, and does not empty the term " evolution " of all that can make it rationally significant.

I have ventured to speak of my personal difficulties in eliminating Time because others achieve what I find to be impossible. And I would not have it suspected that my general line of argument is in any degree weakened by diversity of views in this controversy. Given the conditions of human thought, of which the Time form is one, the problem of origins is essentially the same for all.

THE SCIENTIFIC DATA

Was there a beginning? To this question science cannot give any definite answer. Its aims and methods are such as to lead it to ignore, if not repudiate, the idea of the non-eternity of matter and force. But this is because its aims and methods cannot reach beyond the phenomenal, and because its products are confined to the accumulation, description, and classification of facts as facts. It traces backward and forward the links in an endless chain of causes and effects; it deals with the states and positions of Energy in accordance with the laws of physical causation—or, when it is more thoroughgoing, in accordance with generalizations from observed sequences. It cannot pass beyond the circle of sense-data and direct inferences founded upon them. If it does venture beyond, then, in spite of its wonderful apparatus, it is reduced to ventures of speculative faith or to unwarranted dogmatism.

Now the scientist, however successful he may be in following up his chain of cause and effect, never comes in sight of a beginning. He consequently tends to the conclusion that there was no beginning—that the

universe is eternal. As will appear directly, I am inclined to agree with him. But we must not lose sight of the fact that he cannot prove this eternity. He cannot, any more than unscientific folk, travel through infinity, or tell us what it contains. If in spite of this inability he definitely desires a beginning, he is relying on an act of faith—he may call it "scientific," but it is none the less faith.

There are indeed some physicists who think we have empirical evidence of a beginning, because they regard the universe as a machine wound up and running down. But the doctrine of the dissipation of energy, on which these physicists rely, is being vigorously assailed. In any case the data are quite insufficient to warrant such a pessimistic and oppressive conclusion. (I deal with this matter in Part III. chap. ii. in the paragraph on the Dissipation of Energy.) The universe is not likely to be so badly constructed that it will become an inert mass of matter; and until such a dismal world-view is shown to be inevitable, we shall do well to regard it as a scientific curiosity, marking a stage in the progress of cosmic speculation.

We can take a more general outlook. Suppose we could really prove that the present order had a beginning, it would not follow that this was the beginning of creation. We might retire on the venerable idea of a rhythm—the idea so remarkably revived by Herbert Spencer in his "First Principles." Or we might hold that the present order is but one of a succession. For all we know, there may have been, and there may still be to come, an endless series of differing reconstitutions of cosmic processes—in other words, an endless succession of evolutions of the same Energy as is now manifested to us. No—science cannot solve the problem of beginning. If its testimony is to weigh at all, it would seem to be on the side of those who argue for the eternity

of Energy—not, of course, in its present forms, but as undergoing continuous transformations.

HAD CREATION A DATE?

The scientific, or causal, point of view might be satisfied if the Theist would allow an infinity of purposes manifested continuously in the universe as created by God. But it is generally thought that such a supposition is forbidden by the very fact of creation. If God made the world He must be prior to the world.

A little reflection, however, will show that the conclusion does not necessarily hold good. To recur to an illustration previously utilized: the sides and angles of a triangle simply coexist; the nature of space being what it is, the angles imply the sides and the sides the angles. There is no element of succession involved. May not God's nature be such that it involves the existence of a universe? May it not always have externalized itself in creation, without thereby ceasing to be the Ground and the Sustainer of that creation? It is hardly necessary to point out that to allow this is by no means to postulate an eternally existing material, independent of God, on which He works, in a Platonic or any other fashion, to reduce it to order. The world would be eternal, but simply as the expression of the creative will of God.

One merit that such a theory would possess would be this—it liberates us from supposing that, at some definite particular time, God's mind underwent an alteration or modification which induced Him to make a new departure. We could then grant the scientist his eternally existing universe without losing grip on our Theism. For we are free to argue that the same mystery of unbeginningness confronts him as well as the Theist, and that the question so becomes one of deciding which theory offers the most rational explanation of

things—the spiritual or the material. Whereas the materialist's process of causes and effects is blind, meaningless, and out of touch with the higher facts of our experience, the Theist grounds that process in a Being Who is rational and purposeful. It would seem that hesitation is here irrational.

ETERNITY

There are some who, in opposition to the idea of an eternal creation, argue that in infinite time the world would have gone through all possible changes and have thus arrived at a state of changeless equilibrium. In other words, they hold that the infinity of Time contradicts the conception of a process.

This argument may be valid as against a materialist, and certainly renders his position still more untenable. But it does not affect the Theistic form of a belief in the eternity of the creation, for the Theist postulates a living personal Will as the Ground and Sustainer of the process; and creation thus becomes as living and continuous as the Being of Whom it is a manifestation.

Others there are who retire upon a distinction between Time and Eternity. One such thinker inclines to the speculation that Eternity is the Ideal, not the negation, of Time, hoping thereby to lighten the difficulty of supposing an Eternal God to have made a new start, so to speak, by creating. Time would thus be "an imperfect shadow cast by Eternity on the prescient soul of man." As the process of evolution advances, it draws nearer to the ideal, and, when it is complete, merges in Eternity.

This speculation is attractive. But even though it were warranted by the facts of experience (as I cannot think it is) it leaves the fundamental difficulty untouched — it does not account for "succession," either in regard to beginning or to ending. Shelley may picture Time

as a myriad-coloured dome that stains the white radiance of Eternity. But the question remains: Does Eternity allow of succession? If not, the speculation contradicts itself. If it does, we have still on hand the core of the problem of Time. The Bergsonian concept of duration is more provable and more consistent.

ORIGEN AND AQUINAS

In strong contrast to the assertion of a beginning stands the teaching of Origen. This bold and profound thinker held that life on our earth is the continuation of an antecedent existence—that our present lot is the logical and moral consequence of our conduct in a prior state. Our world has had predecessors and will have successors, and God's creative activity is continuous.* This teaching is practically in harmony with the idea that God's creation is as eternal as Himself; and I draw attention to it because it proves that such a line of speculation is not due to the pressure of modern science, but can arise naturally out of the conditions of the problem itself.

It is interesting to note that the subtle Aquinas was not altogether comfortable with the idea of a definite date for Creation. His difficulty chiefly turns on what is, to all intents and purposes, a denial of the *ex nihilo* doctrine. For if God is the Cause of the world, the Cause must always have existed, and must also have always produced its effect. In other words, God's creative activity is as eternal as Himself. But since the Church demanded belief in a beginning, he was content to renounce the claim of reason, and to commit himself to an act of faith.†

Aquinas yielded to authority. To what authority? It is not, as we shall see, the Bible; for that nowhere

* "De Princip.," iii. v. 3–4.
† Cf. "Gent.," ii. 38; "Summa," i. 46, 104.

postulates an absolute beginning. It most assuredly is not science. There remains, it would seem, nothing but the dogma of certain theologians who are supposed to have decided the issue. If we do not acknowledge their authority, we are free. Is it altogether unallowable to suspect that Aquinas was at heart in agreement with Origen ?

At any rate we have his far-reaching thought that the cause must always have its effect. And if the scientist is burdened by an endless chain of cause and effect, I do not see that the burden is materially lightened for the philosopher or the theologian who side-tracks the problem by dissolving it in a timeless Eternity.

A RELATIVE BEGINNING

I have referred to the possibility of there having been a succession of cosmic processes. If we ask what this implies, we find that it suggests a series of beginnings ; and " beginning " thus becomes a relative, not an absolute term. Our particular cosmic process would have entered on its course of evolution when its predecessor was consummated, just as most Theists believe that there is ahead of us a " new creation."

In favour of this view we have the natural inference that where there is a development there must be a starting-point—that where there is a determinate Becoming, it must have issued from something determinate. In our personal experience, we can distinguish stages in the unfolding of our potentialities ; and we cannot believe that our present condition is the resultant of an infinite number of such stages. Let us speculate as we will in theories of reincarnation and metempsychosis, we cannot carry these imaginings back into eternity. What we actually are is much too concrete and finite to admit of such limitless existence. And we argue outwards

from ourselves to the world of which our limitations form a part.

TIME PROBLEM NOT CRUCIAL

For myself, I incline to the view that the Eternal Cause has always had, and ever will have, its correspondingly eternal effects, and that God's creation is coeternal with Himself. I do not, however, press the point, for we are admittedly in the sphere of ultimates which are beyond our finite powers. But let it be clear that the main conclusions at which I have arrived are unaffected by these speculations as to the nature of Time. Neither the affirming nor the denying of a beginning is inconsistent with the belief that the Source and Sustainer of the cosmic process is a Personal God everywhere and always active. If we decide for one definite beginning, we have a creation with a fixed time limit as the result of a highly special creative act. If we decide for an endless succession of processes, we remove this time limit, and generalize the creative act; each beginning would then be relative to what preceded and to what followed. But be these things as they may, the facts of our experience remain, in all their manifoldness and in all their degrees of dignity and significance. And for these, reason and feeling alike demand that we shall discover a Ground that shall be adequate to the facts in their entirety.

CHAPTER IV

EX NIHILO

Ex nihilo nihil fit. Whether this postulate be allowed or not, at any rate its opposite is in a full sense inconceivable. Science is definitely committed to it; philosophy and theology do not venture to question it unless impelled by some special exigency. For myself, I adopt it unreservedly, and lean upon it heavily in my argument from the data of experience to the nature of their Ground. That is to say, I assume there is nothing in the range of our experience which has not a sufficient cause, or sufficient reason, in the self-existing nature and properties of ultimate Being.

Certain theologians have repudiated this postulate. Prompted by a desire to impose no limit on God's creative activity, they conceive that they must affirm that He creates *ex nihilo*. I have some sympathy with their anxiety, but I hold that it is oversensitive, and, in this form, quite unnecessarily indefensible. Still, the repudiation exists; and it will therefore be well for me to justify my constructive work by reviewing the arguments and defining my own position.

DOGMATIC AFFIRMATIONS

Fortunately the Reformed Churches have not committed themselves to this doctrine as *de fide*; though they would seem, in their average attitude, to be in favour of it. The Roman Catholics, however, have dogmatized. By one of their authoritative writers creation is declared to be a Divine action whereby God brings into existence the entire substance of a thing

from a state of non-existence—*productio totius substantiæ ex nihilo sui et subjecti.* Under the stress of advancing knowledge, especially of the evolution hypothesis, the modern representatives of scholastic mediævalism have drawn the following distinction. Creation in the first degree accounts for the origin of disembodied spirits (the angels), of the primordial matter of the universe, and of the human soul. Creation in the second degree concerns the development of the universe, of plant and animal life and the formation of the first human bodies. This is the administrative or formative activity of God, and does not demand the creative act as such.

The distinction here made is welcome as a sign of the plasticity of the most rigid systems of dogma. Moreover, it is one which, with considerable modification, I myself adopt. For I shall argue, at a later stage, that individual centres of conscious will cannot, as such, be products of the evolutionary process. But the main thesis, that creation is out of nothing, is disastrous to theistic cosmology, because there is then no way of arguing from the nature of the creature to that of the Creator; the universe is no longer a manifestation of God's own nature, but a Becoming from an inconceivable Nothing.

ORIGIN OF CONCEPT

Whence came this irrational concept? I mentioned above its appearance in the Rig-Veda; but in that ancient speculation, it was Nothing itself which gives birth to Being; whereas these theologians make Being create out of Nothing. Despite the difference, the reasoning process is in each case the same—the thinking away of all content of our actual experience. When the abstracting process is as complete as negations can make it, the result is called Nothing; and to create out of

this Nothing is supposed to be a proof of God's unlimited power! The authors of this blank concept are never tired of telling materialists that the categories and formulæ of science are but abstractions which can never give us the Real. In this, doubtless, they are largely justified. But are they the people to take this line? If they are conscious of the inconsistency, they must be strong believers in the counsel—*pecca fortiter*.

CRITICISM OF CONCEPT

In dealing with this *ex nihilo* doctrine, I might insist on the implication of the preposition *ex*, and in some Hegelian fashion infer that Nothing is the material out of which Being is fashioned. The champions of *ex nihilo* protest against such a mitigation of their thoroughness, and are firm in requiring that Nothing shall mean simple, unrelated non-existence. In any case I am not anxious to press the point, though it would be quite fair to be dialectical in such dialectical company. I want to keep to the facts of our actual experience. True, we cannot follow them out to ultimates. But our inability does not warrant us in laying aside Occam's razor, or in plunging at a bound into incomprehensible abstractions —more especially as we have among the data of experience the creative activity manifested in human art.

OURSELVES AS CREATORS

It is certain that we ourselves are, in a very real sense, creators. On one side we are products of the cosmic process; but on another side we can direct, within limits, the course it shall take, both as regards our individual development and also the world outside of us. I lay stress more particularly on artistic creativeness as being the activity most patently akin to that of which we are in search.

Let us imagine ourselves present while Dürer is

etching his "Melancholia" or his "Knight and Death." We see the materials he is using—his copperplate, the acids, the gravers, and the rest. We watch him as he sets to work all the complexity of his nerves and muscles. We follow him as he adds line to line with exquisite skill. In them, and in many other regards, we cannot claim that he is a creator. But when the picture is finished, there is something in it over and above all these—there is the embodying of the activity of his æsthetic genius—something new has come into existence, something that did not exist before he, as an individual artist, gave it birth. In a very real sense, he has "created" something.

Let us fix our attention on the "created" factors in the picture. Were they *ex nihilo*? If not, why not? We deny them to be such because we feel that they are the expression of the artist's inmost nature—they are realizations of his inherent potentialities. Apart from Dürer, they are *ex nihilo*. But we have Dürer to reckon with, and the created factors are Dürer made manifest; they are part of his being made objective so that they take their place in the phenomenal world. Why should we go beyond this datum of experience in trying to gain an idea of God's creative activity? Why should we hesitate to look on the universe as part of His Being made manifest?

If it be objected that Dürer could not express himself without pre-existing materials, the objection is beside the mark. No one would be foolish enough to parallel human creativeness with that of God in scope or in completeness. The question is: Can we find in Dürer's artistic activity any element which depends on what we may call his own "substance"? If we can, we have but to extend indefinitely the field of such activity and free it from extraneous limitations, when we would attain to a reasonable and "working" conception of the Divine activity. We can then affirm that the universe

is a manifestation of God's own "substance." We may take it that He has projected, or made objective, certain portions or "parcels" of His own Being, so that they possess, as Dürer's picture possesses, a relative degree of independence. What need is there for *ex nihilo*?

Again, when we admire Dürer's picture and enter into the spirit which inspired it, we keenly feel the spontaneity of it—it is a work of genius, in the sense that it welled up freely out of the depths of his personality. The artist did not create out of nothing, he expressed himself; but he was none the less free, because he was self-moved. And so in saying that the universe is a manifestation of the Creator's own nature, we are not imposing limits which would derogate from the self-completeness of that nature, nor are we denying that He is free, spontaneous, in His action.

It would seem, then, that the champions of *ex nihilo* are overanxious in their desire to conserve the Creator's power and self-sufficiency. Moreover, they rob us men of our highest dignity, that of being made in the Divine image, and of being, in a genuine sense, "fellow-workers with God."

I submit, therefore, that the experience of human creative activity affords us a basis for gaining some conception of the nature of the Divine creative activity. We do not in any way impose limitation on God, by supposing Him to project His own Being into that which objectively manifests it. Creation does, indeed, imply limitation; but the limitation is self-imposed, and is therefore free and spontaneous. Our chief concern is to discover, so far as we may, why God has thus limited Himself. What is the aim, the goal, He has in view?

EX NIHILO AND EVIL

An objection may come from the other side. If it is maintained that the Creative Power is the Ground of all

things, we make that Power responsible for moral evil. I grant that the objection is formidable for those who, like myself, admit the reality and validity of moral distinctions. But I shall show, when I approach the problem of evil, that it is by no means inconsistent with the postulate, *ex nihilo nihil fit*, to hold that God may be the ultimate Ground of the existence of evil and yet not be responsible for it. So far from regarding this objection as valid, I would find in the existence of moral evil an *ad hominem* argument against the doctrine of creation *ex nihilo*. For moral evil is a reality. How does it come into being? The champions of *ex nihilo* maintain that God alone can exercise the power of creating *ex nihilo*; then the Becoming of evil cannot be *ex nihilo* without making God directly responsible for it. If it is not *ex nihilo*, and is yet a reality, then man has the power of bringing into existence something which did not exist prior to his activity. That is to say, a human will can create in the absolute sense without the creation being *ex nihilo*. Why then should we seek to postulate a wholly different mode of activity in God when we would account for the existence of what is good?

ST. ANSELM

From the purely theological standpoint, I urge my negation of *ex nihilo* with the greater assurance because even the authoritative theologians of undivided Christendom are not all of one mind in the controversy. I take as an example the views of that profound thinker, St. Anselm of Canterbury. He was not afraid to criticize the current traditional ideas, and modified them in the direction of Platonic doctrine. He argued that there is no way in which anything can be made by another unless it previously exists in the mind of the maker. Before creation, he teaches, things existed

eternally from God and in God as Ideas. They did not exist as individuals, but in the sense that God foresaw and predestined that they would be made. That is to say, before the making of the universe it was in the thought of God, but no material existed out of which it was to be made. It was thus that Anselm remained staunch to the demands of reason while respecting the accredited interpretations of Genesis.

If we add to the Divine Ideas the power that is manifested in actualizing them, and acknowledge that this, too, is part of God's Being, we have a doctrine that will not clash with any received conclusion of reason or of science.

CERTAIN OTHER CHRISTIAN FATHERS

Anselm was by no means alone in this line of speculation. Two early Fathers, Justin Martyr and Clement of Alexandria, had kept in sufficient touch with Jewish exegesis to save themselves from the misunderstanding of the opening verses of Genesis. They recognized the similarity between the unanalysed dualism of the ancient cosmology and the doctrine of Plato. They both held that Plato had Atticized Moses! Justin Martyr, quoting the verses, says that the Greek philosophers and " we ourselves " have learnt that " through the Word of God the whole world came into existence out of things adjacent, and before declared by Moses." This is startling; but it is better than mistranslation and unnecessary inconceivability.

SCOTUS ERIGENA

Another deep thinker of the Middle Ages shall supplement the speculations of these early Fathers—Scotus Erigena. In substantial harmony with Anselm, he taught that " God's working is equally eternal with His Being; that creation is involved in His essence; that

He necessarily manifests Himself in the world ; that He precedes it, not in time, but only in the idea as its Cause." *

EX NIHILO REJECTED

And why should we not accept the teaching of Anselm and Erigena ? Our reason demands, on the one hand, that Nothing shall mean Nothing; and science demands, on the other, that we shall trace back all that exists to what previously existed. *Ex nihilo* needlessly outrages common sense, trained reason, and scientific postulates. It is assuredly simpler and more natural to hold that the Creation is, in some mode of externalization, the expression and embodiment of the will, the mind, the love of an eternal God. Such a doctrine does not in any wise interfere with emphasis on the transcendence of the Creator ; and it gives content, full and rich, to emphasis on His immanence.

* "De Divisione Naturæ," iii. 25.

CHAPTER V

ANTHROPOMORPHISM

In reliance on the dictum, *ex nihilo nihil fit*, I am about to make a series of inferences from the facts of experience to their Ground. This line of argument is at once inevitable and dangerous. Some there are who think they have condemned it when they level against it a charge of anthropomorphism; by which they mean, an unwarranted reading of ourselves into our explanations of Nature, or into our conceptions of a Supreme Being. It is therefore advisable to clear the issues. For our own sakes, as well as by way of precaution, we must give the charge a fair hearing. There can be no doubt that it is often justified; but reaction against misuse may lead to other and even more dangerous errors.

THE ATTITUDE OF SCIENTISTS

Science, no less than philosophy and theology, took its rise in mythology. Primitive myths, however incoherent and fantastic, were the outcome of reflective thought and of genuine effort to bring order into the overwhelming and apparently unconnected details of human experience. Early thinkers naturally argued from the experiences best known to them—their purposive volitions. The fundamental primitive belief for cosmological speculation was that of powerful and invisible agencies at work in the world at large—agencies vaguely conceived indeed, but, save for the degree of their power, essentially human. It was only by slow degrees that differentiations arose between the various forms of research, thought, and speculation.

And thus science can boast no superiority or priority of origin, nor can it show that it had any special degree of naturalness or spontaneity. It tends, indeed, to claim that it is wholly objective in its methods and results: but a closer analysis of its postulates and suppositions soon shows how vain is the attempt to jump out of our own skins.

The unmetaphysical scientist, however, is often convinced that his methods and conclusions are completely deanthropomorphized—that he has secured a detached outlook, and is able to see and describe things as they really are. It is incumbent on us to show more fully that he is under a delusion. True he has escaped from the crudities of animism, magic, and the like; and we are profoundly grateful to him for enabling us to see certain kinds of phenomena in clearer outline and "colder" light. Nevertheless his thought is still human; and all the material with which he deals is conditioned by this fact.

We recall how that the most widely accepted generalizations of science are, at bottom, working hypotheses, and, so far, permeated with subjective elements. There is not one of them which can be demonstrated as an ultimate—hardly one of them which is not under fire of destructive criticism. We shall be quixotic if, on this score, we refuse to build upon them to the best of our ability; but we shall be self-deceived if we imagine them to be wholly objective. The really pertinent question, then, is not, Is this anthropomorphism?—but, What sort of anthropomorphism is it?

THE CHANGED OUTLOOK

Pope's celebrated savage saw God in winds and clouds, and was pitied accordingly. I hold that the savage was only relatively in error, not fundamentally. He attributed to his God, all too naïvely, the qualities he found

in himself—cunning, choler, caprice. The modern Theist has risen to higher conceptions of the Divine Nature; but he has not ceased to draw upon the facts of his own experience. He sees that God governs by and through laws which are, from our standpoint, of cosmic universality: that the scale on which God works is sublime beyond the utmost flight of our imagination. But there is fundamental continuity between his belief and that of the savage. For he still looks out on the universe through the only window that is possible to him—that of his own inner and immediate experience. I am not arguing for pure Idealism—I am only denying the possibility of an absolutely objective Realism.

All this applies, *mutatis mutandis*, to the scientist. He may speak of force as though it had an existence that can be perceived apart from subjective conditions. This is notoriously not the case—the real basis of his concept of force is his own immediate sense of effort. When he speaks of causation, he is importing into phenomena (and rightly so, as I hold) his immediate experience of effects following on his own volitions. And this example may be paralleled in every branch of scientific inquiry. Has not F. C. Schiller good reason to write thus?—"We may lay it down as a canon of inquiry that a principle is the better, other things being equal, the more closely it clings to the analogy of human agency, the more completely parallel its course runs to the course of the human mind."

ANTHROPOMORPHISM INEVITABLE

The fact of the matter is that anthropomorphism is a necessity, because we are organically and essentially part of the Nature we try to interpret. Strange that scientists should so often forget this! There is an indissoluble connexion between us and the phenomena external to our minds; and thus, in reading ourselves we are reading

Nature, and in reading Nature we are reading ourselves. We are liable to error here as in everything else, and our procedure must therefore be critical—but we cannot dissolve the bond ; for it is not created by thought, but by Being.

COMTE

The most systematic attack made upon all forms of anthropomorphism is that of Comte in his celebrated doctrine of the three stages through which he held that human thought has to pass—the Theological, the Metaphysical, and the Positivist. The last of these is supposed to render void and supersede its two predecessors, by virtue of its being their crown and fulfilment. We may readily grant that Comte's historical survey is of great and permanent value, without admitting the soundness of its main conclusions : even sympathetic critics allow that they are hasty and largely untenable. His greatest error, perhaps, was that he abjured metaphysics—thus committing himself to an attempt which Huxley himself declared to be always doomed to failure. After the style of something very different, if metaphysics be turned out of the door, it will come in at the window.

A great admirer of Comte, Fiske, has clearly demonstrated the weakness of this Positivist doctrine. He shows that Theology and Metaphysics must be as persistent as the sciences that collect and correlate observable facts. His criticisms may be thus summarized. Theology began in Fetishism. Phenomena were endowed with a life of their own. Fetishism developed into Polytheism, which generalized groups of phenomena and regarded each as under its own deity. Polytheism culminates in Monotheism which arises when men have gained the idea of a universe. Metaphysics runs a similar course ; it carries into greater detail the

generalizations at which men have arrived, and gives them a more impersonal abstractness. It culminates in positing one grand entity, Nature. Positivism struggles to give unity to the various sciences and departments of human knowledge, and is to culminate in including them all as particular cases of one all-comprehending fact.

Fiske thus holds that each of the three great activities of thought develops on the same lines, and culminates in a similar unity. There is no succession—no ousting of one by another, but a continuous and persistent development of each—Positivism being the latest in the field and therefore the least complete.

A CRITICAL ANTHROPOMORPHISM

We need not bind ourselves to these conclusions; but at any rate we may welcome them as a clear recognition of the persistence of a rational anthropomorphism. The idea of a single causal Agent, behind and within the universe, remains, whatever may be the advances of science. No vital element in primitive thought is lost: it is merely purged and subtilized. And further, as Herbert Spencer contends, the Nature in which metaphysics culminates is a conception which implies the consciousness of a single Source, differing only in name from the consciousness of one Being manifested in all phenomena. So also, even in the case of the all-comprehending fact in which Science is to culminate, we similarly recognize "the ultimate Existence of which this single fact is alleged: and the postulating of this ultimate Existence involves a state of consciousness indistinguishable from the other two."

No, let Positivists and Materialists be as objective as they can, while human thought is what it is—part and parcel of the universe it strives to interpret—it must be anthropomorphic. In other words, so long as men allow full and natural play to their faculties, they will be

led to assume the existence of a Supreme Being, everywhere and always active, Who is the Ground and Source of all that exists. And when they would learn what His nature is, and His mode of working in the Cosmos, among other means, they must reflect on the facts of the external world interpreted in the light of their own immediate experience.

CHAPTER VI

THE GENESIS COSMOLOGIES

Although I am avoiding the purely theological aspects of the creation problem, there are certain misconceptions and prepossessions which gain unwarranted strength because they seem to have theological authority, and which therefore require attention if the way to free inquiry is not to be unduly barred. Not the least harmful of these misconceptions is the idea that Revelation has once and for all determined what we are to believe concerning God's creation of the world. It behoves us, then, to ask what is the teaching of the Bible in this regard, and we begin, of course, with Genesis.

GENESIS AND SCIENCE

It is a happy thing for our inquiry that the days are gone when all inquiry concerning creation was foreclosed by the final authority of the received interpretation of the Genesis cosmology. Did the geologist find shells on elevations far above sea-level? Then God created them just as and where they are discovered; or, what seemed to some more probable, the devil put them there to deceive and confound the faithful. But we need not slay the slain. Let us enjoy the freedom we have won, and learn to appreciate better the moral grandeur and marvellous insight displayed in these venerable records.

We have shaken off the bonds of the letter; but there still appear from time to time more or less ingenious attempts to reconcile Genesis and science. I do not propose to add to the formidable number of these.

Indeed I cannot but agree with Driver in his conclusion that when we turn to the Mosaic Cosmogony for supernatural information on points of scientific fact, we mistake its whole purpose. I also agree with this reverent and cautious critic in his further conclusion that there is nothing in the cosmogony of science that is in conflict with the deeper teaching of the Genesis narrative, nor anything which can obscure the wonder of its insight and speculative power. There must be few nowadays who cannot unite keen appreciation of the larger harmony with hesitation to force it into perfect consonance.

Recent research has abundantly established the historical connexion of this Genesis cosmogony with those evolved by surrounding nations. In general structure and substance it is not original. The valid claim for originality rests on the lofty style and the enlightened spirituality so conspicuous in this Hebrew effort to pierce to "origins." It is in its firm grasp of fundamentals that we discover its true inspiration and value, not only relatively to the time when it was written, but for all time. Let us note a few of its more peculiar characteristics.

COSMOGONY AND COSMOLOGY

It is generally spoken of as a cosmology, and rightly so up to a point. For it is more than a cosmogony. A cosmogony is an account of how the world came into being. The use of the term is practically confined to the creation myths of primitive peoples, the study of which has been of late years so vigorously prosecuted; though it is occasionally extended, in accordance with its etymology, to include such scientific systems as that of Laplace or the nebular theory. The Genesis epic, however, is more than a mere account of the coming into being of the world. It contains distinctly moral and philosophical elements, and so merits the name of a cosmology. A cosmology aims at understanding the

governing laws of the universe. Can it be denied that the first chapter of Genesis is pervaded by what was then a unique sense of law and order? Its moral and spiritual intensity rule out the play of fantasy and caprice. Mythological detail is cast aside, and the successive stages of creation are exhibited in an historical development which tends to a definite goal.

Some would restrict the use of the term cosmology to scientific accounts. Even so, it might be contended that Genesis embodies the science of the time in which it was written. But I go further, and would urge that, while the scientist is justified in adopting a certain method and in keeping within the limits thereby imposed, he has no right to forbid others to take a wider range. For if we are to get at the Logos of the universe, in any adequate sense of that noble word, we cannot rest content with classification and description. We must delve to the heart of things; we must emphasize meanings and values. I hold, then, that the Genesis epic is a cosmology as well as a cosmogony.

GENESIS IS GEOCENTRIC

It is a charge against the Genesis narrative that it is frankly geocentric. Sun, moon, and stars are created simply for their relation to the earth, and the horizon never extends beyond man and his abode. Obviously this criticism can only affect those who adhere to the old theory of verbal inspiration. It may, nevertheless, be useful to consider it for a moment in order to discover the true character of the narrative. All early myths were geocentric. How could they be otherwise? The earth, as known to the ancients, was but a limited expanse beyond which their thoughts could not easily travel. But the great elemental phenomena—sun, moon, and stars, winds, storms, clouds, oceans, rivers, night and day, the alternations of the seasons, and the rest—

were constantly with them for good or ill, and, as Max Müller has so strikingly shown, vividly impressed their imaginations and moulded their religions. Hence also the remarkable similarity pervading whole groups of myths. Certain conspicuous natural phenomena were common to the peoples in which they originated, and there was the same tendency to concentrate on those which most directly affected human interests.

While frankly geocentric, however, Genesis is infused with the spirit that generates a cosmic outlook; it is only the knowledge of specific facts that is lacking. The geocentric elements are subsidiary and unessential; the underlying principles are paramount and can readily be universalized. They thus retain their value as a simple yet sublime expression of a spiritual world-view. If the framework is geocentric, the soul is theocentric. And thus, although detailed harmonizings with science are strained and unconvincing, larger adjustments are always possible and profitable.

DUALISM OF GENESIS

Although the Genesis epic is prompted by a truly scientific impulse, in that it demands the reign of law and order, it has not advanced to the stage of an analysis of the concept of creation. We must not, therefore, lay too much stress on its implicit dualism. The general interpretation of the first three verses—largely based on the Septuagint and Vulgate—supposes that God first created the heaven and the earth, and that after its creation the earth was "without form and void, with darkness on the face of the deep." Most critics are now agreed that this is wrong. And we may be glad that they have decided thus; for it is hard to think that God would create a Chaos! But even were the interpretation to stand, the Hebrew word for "create" would still suggest the idea of carving the earth and the heavens out of some pre-existent material.

The translation, however, that is advocated by many modern scholars (mentioned by Driver as an alternative) is one which had been advanced by the celebrated Jewish commentator Rashi (A.D. 1040–1105), and similarly Ibn Ezra (1092–1167), and which is definitely adopted by Walsh in his "Doctrine of Creation," runs as follows:

"When God began to create—the earth being without form and void and darkness being upon the face of the deep, and the Spirit of God brooding on the face of the waters—God said, Let there be light, and there was light." (Note the parenthetic participial clause.)

It is clear, from this widely accepted version, that the earth and the waters are conceived as in existence at the time of the first creative act. That is to say, there is a conscious (or unconscious?) dualism suggestive of that of Plato. We ought not to lay too much stress on the point. The idea of creation was still encumbered with uncritical analogies from human "making," and the writer was adapting traditional material in which the dark watery Chaos had a recognized place. But suppose the point were pressed, God's supreme Creatorship would not be materially limited. For, as was shown in the chapter on "Beginnings," the beginning of Genesis may be regarded as the opening out of a new cycle of creation after the completion of its predecessor —the emerging of a fresh purpose.

GENESIS AND EVOLUTION

Another charge against the Genesis epic is that it assumes immediate and special creations as opposed to continuous evolution. Were the charge altogether valid, a sufficient refutation is found in the conditions of its geocentric outlook. The rigid doctrine of verbal inspiration being discarded, we are prepared to find immature conceptions, and to examine the narrative in its historical perspective.

But the charge is not altogether valid. For in this account of Beginnings we find two different modes of representation employed. There is a direct and definite "making," as in the forming of man by God's own hand; and there is creation by a command issued to a previously existing material—as when God says, "Let the earth bring forth all manner of herbs." In this latter, the inherent powers of the soil are commanded to manifest their potencies and to develop the plant world. We have here, in germ, not only the concept of evolution, but of abiogenesis, or the development of living organisms from what we so grievously malign by calling it "brute" or "dead" matter. We are not surprised, then, to find two such acute thinkers as Augustine and Aquinas seizing on this germ-suggestion, and enlarging it. They held that certain primordial elements, endowed with dispositions and powers (*rationes seminales*) were "created" in the strict sense of the term; and that the rest of nature—plant and animal life—was gradually evolved according to a natural order, under the supreme guidance of God. It is only a step from this to the modern theory of evolution. How different from Milton's crude imaginings! God spake:

> *the earth obeyed and straight*
> *Opening her fertile womb teemed at a birth*
> *Innumerous living creatures, perfect forms,*
> *Limbed and full grown. . . .*
> *The tawny lion, pawing to get free*
> *His hinder parts, then springs as broke from bonds,*
> *And rampant shakes his brindled mane.*

I noted in the previous chapter how modern Roman Catholic theologians allow considerable liberty in this regard by drawing a distinction between primary and secondary creation. I will supplement what I there said by quoting this recent pronouncement of an

eminent Jesuit. "The words of Genesis . . . maintain nothing else than that the earth, with all that it contains and bears, together with the plant and animal life, has not produced itself, nor is the work of chance, but owes its existence to the power of God. However, in what particular manner the plant and animal worlds received their existence: whether all species were created simultaneously, or only a few which were destined to give life to others: whether only one fruitful seed was placed in mother earth, which under the influence of natural causes developed into the first plants, and another infused into the waters gave birth to the first animals—all this the Book of Genesis leaves to our own investigation and to the revelations of science, if indeed science is able at all to give a final and unquestionable decision. In other words, the article of faith contained in Genesis remains firm and intact if one explains the manner in which the different species originated according to the principle of evolution." *

This passage is a noteworthy attempt to combine the old and the new. It does not go far enough to allow of the thoroughgoing evolutionism which I shall advocate; but it is itself capable of further expansions, and in any case helps us to understand that Genesis is not contradictory of those concepts which bulk so largely in modern thought.

THE TWO CREATION NARRATIVES

It is now generally agreed that Genesis i. and ii. 1–3, forms a separate whole, and that what follows is a quite different cosmogony. It can hardly escape even a superficial student that the fresh charm and naïve anthropomorphism of Genesis ii. 4–25, move in another world than that of the sublime epic. God is represented as moulding, breathing, planting a garden, walking in

* Knabenbauer, "Stimmen aus Maria-Laach," xiii. 74; cf. Muckemann, "Attitude of Catholics towards Darwinism and Evolution," 78.

it—in short, as "making" in a very human fashion. Heaven and earth are taken for granted, nor is there any question as to how they came into being. Nevertheless there is the same profound moral insight and spiritual earnestness.

In this more naïve narrative God is represented as making with His hand. The epic that precedes it takes an enormous stride in advance. There is still an intermediary between the act of will and the result; but it is no longer the hand: it is the majestic "Let there be light" —the uttered word. We thus find in the brief compass of these two chapters a striking example of development in the purity of cosmological ideas, and a concurrent spiritualizing of them. This uttered word develops further through the subtlety of Greek thought into the personification of the Logos. "In the beginning was the Word. . . . All things were made by Him."

TRUE VALUE OF GENESIS

It is matter of history that these Genesis narratives have exercised a profound influence on the course of Western speculation about "origins." It is also plain that, when rightly interpreted, their value is not diminished by the advance of knowledge.

As regards the *ex nihilo* doctrine, the Genesis conception of creation is at the opposite pole. So far from teaching that creation is out of Nothing, these ancient cosmologists were implicitly dualists. For them, God "makes" by working up pre-existing material. It would be indefensible to use their uncritical statements as decisive in the controversy; but at any rate they cannot be said to favour those who have soared into the realm of the inconceivable abstract.

Enough that down the ages they have confirmed the faith of Jew and Gentile in the belief that

God's in His heaven; all's right with the world.

CHAPTER VII

BIBLICAL AND CHRISTIAN CONCEPTS

Special attention has been devoted to the Mosaic cosmogony because of the unique influence it has exercised on the dogmas and speculations of Christendom. Let us now touch more lightly on the cosmological ideas found in the Bible as a whole, and such of the interpretations put upon them as are more germane to our subject.

Hitherto the doctrine of *ex nihilo* has been to the front; nor must it now be lost sight of; for consciously or unconsciously it colours our views, and tends to obscure what I hold to be the vital issues in a truly Theistic world-view.

Two preliminary points. First, as regards the conception implied in the *ex nihilo* doctrine, it never occurred to the Hebrew mind in any definite form. Indeed it is foreign also to Western thought, until it emerged as a product of systematic theology. And second, we must remember that the Hebrew mind was not metaphysical, and that, speaking generally, we must not expect from it accurate definition or analysis in its cosmologizing. So far, however, as we can draw fair inferences from the poetical or the uncritical terminology of the scriptural authors, we shall see that they never definitely declare themselves against the implied dualism of the primitive cosmologies.

OLD TESTAMENT

Some of the most striking cosmological statements in the Old Testament are found in Deutero-Isaiah. In

passage after passage, he insists on large conceptions of God's power and sovereignty. Not only is God "the high and lofty One that inhabiteth eternity, whose name is Holy" (lvii. 15), but He is the omnipotent and unfettered Creator, Whose sceptre reaches to every part of the universe, Who moulds its forms and guides its destinies. Here is a typical declaration: "I form the light and create darkness; I make peace and create evil" (xlv. 7). Taken strictly, the latter part raises a serious difficulty, for we cannot readily grant that God can be the direct Creator of evil. But the difficulty no longer exists if we make due allowance for strong feeling and for poetic diction. The old myths are lost from view, and the emphasis is vividly laid on the unique and universal sway of God as Creator. The prophet's inner meaning is seen in such a passage as this: "I am the Lord, that maketh all things; that stretcheth out the heavens alone; that spreadeth abroad the earth. Who is with Me?" We must be careful, then, lest, with our theological prepossessions, we read into this exalted diction a greater degree of definiteness than is warranted. Taking it as it stands, we find in it nothing that expressly supersedes the Mosaic cosmogony; still less do we find in it the assertion of the *ex nihilo* doctrine.

If this is the case with Deutero-Isaiah who is so exceptionally determined to emphasize God's unique sovereignty, we are not likely to discover more definite doctrine in other Old Testament writers—in Job, or the Psalms, and so on. In most of the passages dealing with cosmogony, the reference to Genesis is even more pronounced than in Deutero-Isaiah. A typical example is: "By the word of the Lord were the heavens made, and all the host of them by the breath of His mouth" (Ps. xxxiii. 6). We have the creative fiat bringing order and harmony—the uncriticized Mosaic cosmogony supplies the range of concepts within which the psalmist moves.

If we make an incursion into the Apocrypha, we find a passage much relied on by Roman Catholic theologians (2 Macc. viii. 28). The mother bids her son: "Lift thine eyes unto the heaven and the earth and see all things that are therein, and thus recognize that God made them not of things that were, and that the race of men this wise cometh into being." The Vulgate takes the expression, "not of things that were," too strictly, and renders it *ex nihilo*; but the original does not imply more than giving form to that which was without form—an equivalent of "the earth without form and void."

We can set over against this Maccabee passage, and perhaps interpret it by, an expression in the Wisdom of Solomon (xi. 17) which is most certainly tinged by Platonic doctrine. The writer speaks of God's "all-powerful hand that created the world out of formless matter." There can be no misunderstanding here! And it is significant that the author manifests no consciousness of developing a doctrine that might correct or supersede that of Genesis. The dualism is explicit, but is arrived at by harmoniously blending Plato and Moses.

THE WISDOM DOCTRINE

In the Mosaic cosmogony there is no intervening physical agency—hand or breath—in the creative act: the silent thought is mediated, however, by the spoken word. "God said"—He spake and they were made; He commanded and they were created. It is not a long step from this merely spoken word to a personified word. A hint was contained in the phrase, "Let us make man"; the idea of co-operation was suggested. An early proof of the working of this germ thought is found in Job (xxxviii. 7) where subordinate powers, "the sons of God," are brought on the scene as co-operating in the creation. The thought, once started, gained force and definition, and became a marked characteristic

of later Jewish speculation. It does not seem to be fanciful to trace in this development the same fundamental desire as that which led to Philonic and Gnostic expansions of Plato's doctrine—the desire to exalt God's attributes by removing Him from contact with lower planes of existence.

In the so-called " Wisdom " books, the personification has made great strides. The spoken word is individualized under the name " Wisdom." When God created the heavens and the earth, " then was I (Wisdom) by Him, as a master-workman, and I was daily His delight, rejoicing always before Him " (Prov. viii. 30). A few verses earlier this Wisdom declares, " The Lord possessed me in the beginning of His way, before His works of old." How little more is needed to give us the prologue to St. John's Gospel !

THE NEW TESTAMENT

If we ask what contribution to cosmological ideas is to be found in the Gospels (apart from the Logos prologue and the passages framed on the same lines), we have to distinguish between the speculative and the practical aspects of the creation doctrine. Our Lord gently and continuously insists on the Fatherhood of God ; and on this teaching He bases His moral and spiritual appeals. Implicit in this assertion of the Fatherhood of God we have strong leading for defining the purpose and goal of creation ; but the leading is implicit only : there is no analysis, no doctrinal development.

Hence it is that in the Epistles there are passages which show little or no advance on the traditional doctrine. For example, in 2 Pet. iii. 5, we are told that certain men " wilfully forget that there were heavens from of old, and an earth compacted out of water, and amidst the water, by the word of God." The echoes of

the Genesis cosmogony are clear and full. The position adopted by primitive Christianity was, broadly, that in the Epistle to the Hebrews (xi. 3)—" By faith we understand that the worlds have been framed by the word of God, so that what is seen hath not been made out of things which do appear." We note here the affirmation of the universality of the creative act, and also the retention of the mediating " word."

The phrase " things which appear " (ἐκ φαινομένων) is of special interest as bearing on the *ex nihilo* doctrine. It might seem that the antithesis to " things which appear " is the " non-existent." But such an inference is unwarranted and unsound. For " phenomena " are " things as they appear to our senses "—the existing forms which are now manifested in the universe. There is no attempt to define the source of these forms other than the general statement that God is their author. In other words, while God is declared to be the universal Creator, there is no intention to assert that the world was made out of nothing.

THE LOGOS DOCTRINE

The general cosmology of the New Testament, then, made no distinct advance on that prevailing in the Jewish communities of the day. The outstanding advance was not in regard to the nature, or the product, of the creative act, but concerned the nature and person of the Creator. I refer, of course, to the Christian form of the Logos doctrine. The story of its development by a fusion of Greek philosophy with Hebraic conceptions of the personified Wisdom has been told in countless commentaries and treatises, and need not be repeated here. The impelling motive was plain. The early Christians, in exalting the Person and the authority of their Divine Master, soon concluded that, as Son of God, His existence and His activity must pervade all space

and all time—that the old creation must be His work as well as the new. The Alexandrian Logos doctrine was ready to hand, and was well known in Hellenistic circles. We see the identification crystallizing, as it were, in the opening to the Epistle to the Colossians. Jesus Christ is there " the Firstborn of all creation," and Himself the Creator. How far removed is this idea of " the Firstborn of creation " from that of creation *ex nihilo*! So far from being called into existence out of nothing, He is the eternally existing " express image of the Father." And it is in Him that " all things were created, in the heavens and upon the earth, things visible and invisible, . . . all things have been created through Him, and unto Him ; and He is before all things, and in Him all things consist " (Col. i. 14–17).

Here is the Logos doctrine in all but name. It was not long before the definite identification was established —the Son of God was declared to be the eternal Logos, the supreme Mediator in the work of creation as well as in that of redemption. The prologue to the fourth Gospel gave new and full content to the creative word of the Genesis cosmogony.

THE CHURCH'S COSMOLOGY

The doctrine of the Logos, when once defined in its larger implications, was bound to exercise a powerful influence on the world-views of those who accepted it. And not the least important of its effects was, that it brought about an explicit repudiation of Dualism. In East and West alike, theologians were united in discarding the idea of " matter " as an eternally existing something apart from, and over against, the Creator. They felt that to admit such a Dualism would be to countenance a rival to the Logos. And they were undoubtedly right if the Platonic doctrine were adhered to. But the objection does not lie as against such views as those of

Anselm and Erigena, who conceived that God's creative activity is eternal with Himself, and that there never was a time when He did not in some form externalize Himself. Indeed the Logos doctrine would seem to close the controversy in favour of such a view; for the idea of mediating a creation out of Nothing involves a double inconceivability.

THE ROOT BIBLICAL CONCEPTION

We may conclude that the fundamental conception underlying the development of Old and New Testament cosmology is this—God is the sole Source and Goal of all things. "Of Him, and through Him, and to Him are all things." Nothing can escape the net of this grand and pregnant declaration (Rom. xi. 36). I venture to expand it thus:

"Of Whom"—God detaches, as it were, but without severing from Himself, a portion of His own Being, and, by a series of individuations brings into being an indefinite multitude of centres of the will-to-live. These centres, in themselves and by their interrelations, constitute the universe.

"Through Whom"—God creates of free purpose, and externalizes Himself, in measure and degree, in the cosmic process.

"To Whom"—the goal of the process is God Himself. He creates that He may have objects of His love who can return His love—who can be perfectly united to Him and to one another in a perfectly harmonized society of free spirits.

I have here anticipated much of what I hope to substantiate in later chapters. But I urge that such a world-view as this in no way clashes with human reason or with human knowledge. Moreover, it can satisfy the human heart.

PART II
EVOLUTION AND CREATION

CHAPTER I
MODERN COSMOGONIES

It is tempting to give some account of the cosmological hypotheses framed by modern physicists. But inasmuch as, from the point of view of the problem of creation, the differences between them do not involve any serious differences in the fundamental principles involved, any attempt at detailed exposition would be beside my purpose. Moreover, they are one and all undergoing constant modifications, and there are but few of their conclusions which can lay claim to finality. A glance, however, at the general tendencies of modern cosmology will enable us to obtain a firmer grasp on the physical aspects of our problem.

THE PRIMITIVE CONDITION

In speculating on the original condition of the stellar universe, the conception most familiar to us is that of a primitive fire-mist—an excessively attenuated dispersal of matter throughout space. Modern research seems to require, instead of a fire-mist, a cold gas; though the whole subject is still one in which the data are too scanty to allow of anything more than tentative hypothesis. One thing is certain, that the actions which have produced the various systems are far more complex than was supposed. This idea of a perfectly homo-

geneous condition of the dispersed matter is, in any case, untenable ; for it must always have possessed differentiations of some kind, otherwise it could not have condensed into its present heterogeneous configurations.

At any rate the marvellous triumphs of the spectroscope have made us reasonably certain that there is unity of material throughout the physical universe. New elements are being discovered in the sun and in the nebulæ, and new states of dissociated atoms. But the basic stuff of matter appears to be everywhere the same. The chemistry of the sun is the chemistry of our earth ; the same elements known to us are recorded, by the aid of photography, in the spectra of stars and nebulæ that are invisible to us by reason of their tenuity, their distance, or other causes. The geocentric outlook, rendered impossible by Copernicus, receives additional blows with every advance in our astronomical knowledge. Whatever may be the origin of our planet, it is indissolubly bound up with that of the universe as a whole.

THE NEBULAR THEORY

Slowly but surely the existence and the significance of the nebulæ have forced themselves on the attention of astronomers. Of one of the great nebulæ, that in Andromeda, Sir Robert Ball writes thus : " If an artist thoroughly versed in the great facts of astronomy had been commissioned to represent the nebular origin of our system as perfectly as a highly cultivated yet disciplined imagination would permit, I do not think he could have designed anything which could answer the purpose more perfectly than does the picture of this Nebula." Again—" If Kant had never lived, if Laplace had never announced his Nebular Theory, if the discoveries of Sir William Herschel had not been made, I still venture to think that a due consideration of the

remarkable photograph of the famous Great Spiral, which was obtained at the famous Lick Observatory in California, would have suggested the high probability of that doctrine which we describe as the Nebular Theory."

We notice that Sir Robert says " the high probability," not " the certainty "—for the Theory is not free from difficulties ; we may say, however, that it is the one which commands the fullest and most general consent. And the announcement that, of 120,000 new nebulæ sighted by the Crossley Reflector, no less than half are spirals—a moderate estimate—has enormously increased the probabilities, because the spiral movement of the condensing clouds removes many of the difficulties connected with the hypothesis of Laplace.

Taking the nebular theory, then, as a basis for inference, we find ourselves in a universe in which stellar systems are continuously in the making. Go back as far as we will, there is no sign of a beginning of the process, nor is there sign of an end. Stars and planets are born, die, and by collisions, internal disruptions, or otherwise, are dissolved again into cosmic dust—to enter into new combinations in succeeding cycles of change. We get glimpses of preceding cycles. Even the humble meteorite has its tale to tell. For many of those which fall on our globe are of such complex structure that they reveal themselves as fragments of worlds that have been and have passed—they carry us back into the abyss of time. An endless regress confronts us into the secrets of which we cannot hope to penetrate. Astronomy, which is in one way the clearest of the sciences, becomes one of the most obscure.

Such is the outlook of physical science ! And yet neither the heart of man, nor his reason, can be satisfied with this. With combined force they stimulate and nourish the conviction that this cannot be the whole tale, and that the physical aspect of the universe is but

one out of many aspects under which existence presents itself to us.

PHYSICAL END OF THE UNIVERSE

These reflections are greatly reinforced when we consider the limitations of our intellect generally, and in particular the tentative character of scientific cosmologies. We are as yet only feeling our way even in matters where mathematics appear to furnish a trustworthy guide. Let us not forget that Newton himself confessed he was but like a child gathering pebbles on the seashore. A striking instance of our fallibility is found in the doctrine, until recently so solemnly propounded, that science could predict the physical end of the universe.

It was argued that the dissipation of energy makes it impossible to regard the universe (a definite whole, however big) as a conservative system. For if we take successively larger spheres in space, it is apparent that there is uncompensated loss of energy. This argument is now considerably strengthened by the discovery that certain atoms, probably all, have a definite term of life, at the expiry of which they are dissociated. Modern physics thus became, after all its dazzling victories, the prophet of a dying universe !

But further discoveries are changing the whole outlook. The pessimistic astronomy worked with gravitation, and showed that it ruled supreme over the motions and configurations of the material universe, drawing together the various bodies into larger and larger masses. It is clear, however, that if this process had been going on from infinite time, the catastrophe would have come about long ago—we should not be here to speculate about it. Science is therefore bound, either to postulate a beginning, and so surrender the self-containedness of its position ; or to embark on new voyages of celestial discovery to supplement its data.

The chief necessity was to find some scattering influence to counterbalance the concentrating action of gravitation. Attention is being drawn to the scattering power of the radiation pressure emanating from hot bodies like the sun. The action of this pressure on small particles of cosmic dust is sufficiently great to overcome the force of gravitation, and the particles thus ejected into space are caught by the gases of the nebulæ. If this be so, there is provided a machinery which checks the waste of force from the suns, and new suns are being formed from the dissolution of the old. There is now evidence also that there is in continual process a building up, as well as a breaking down, of atoms. How this building up takes place is not known; but that it does take place is becoming more generally recognized. The evolution of worlds could thus continue for ever, and with undiminished force. I have already shown * that such an endless series of developed worlds is not inconsistent with the belief in a Creator Who is their Source and Sustainer; nor even with the teachings of certain authoritative theologians.

* See p. 23 ff.

CHAPTER II

THE PRINCIPLE OF EVOLUTION

HITHERTO I have taken the principle of evolution for granted, and have spoken of the "cosmic process." It is time to examine what is involved in this assumption, the nature of the evidence for it, its value for cosmology, and the limitations to its application.

The central principle of the evolution hypothesis may be in a preliminary fashion thus briefly defined. The universe presented in our experience manifests itself as an onward process, in which there is no break, fresh start, or stoppage. The great majority of scientists and thinkers are now in practical agreement concerning the general validity of this idea of continuous process, and use it as a guide in nearly all branches of research. So all-pervading is its influence that "evolution" has become a word to conjure with; and its magic is apt to make us sometimes pass too lightly over problems which are outside its sphere. The right attitude to the hypothesis is one of sympathetic receptivity tempered by a judicious criticism.

A STATIC UNIVERSE

In primitive times, and still among uneducated and unreflecting folk, the world is viewed and accepted just as it is. There is no desire to trace the succession of events nor their connexions. Even educated Christians, until quite recent days, believed that God had created the world, once for all, and as it is, a few thousand years ago; and that, apart from wear and tear, apart from the coming and passing of living creatures, apart

from the insignificant changes wrought by their activities, things are, and will be until the time of their dissolution, just what they were from the beginning. We may call this the " static " cosmology. A hard task it has been to supersede it ! It has proved itself to be almost as static as the conceptions it embodied. But the accumulating mass of opposing evidence has proved too strong for it ; and it is fast becoming a mere landmark by which we estimate the progress of human knowledge.

THE COSMIC EGG

And yet this static conception of cosmology has had a rival that is wellnigh as venerable as itself. In Polynesian creation myths, in Orphic Mysteries, in Egyptian lore, in Eastern Mysticism, the origin of the universe has been found in a cosmic egg. (In Germanic mythology the egg was replaced by a cosmic tree.) That is to say, instead of a static there was a developmental idea of the universe—it was conceived to grow from a germ, and to become what it is by a process.

There is much to be said for this idea of a cosmic egg. For consider the continuous miracle of the hatching of an egg. Its essential part is a cellule, which divides and subdivides by processes which are beyond the reach of science, which grows by ordered and continuous stages, until in due course there steps out into the world a little creature that is an unfathomable marvel of fluffy down, and nerves, and muscles, and delicate tissues. It at once begins to look out on its new sphere with unbounded eagerness and curiosity ; it seeks for food ; it knows its mother ; it distinguishes straightway between her inviting cluck and her warning call to come to shelter. It contains a whole bundle of interconnected appetites and instincts which preserve and guide it in its perilous venture into a dangerous country. By further processes

it develops into the full-grown bird, with larger powers and with ripened experience.

The cellule has developed into a chick—the chick into a full-grown bird. And how ? By a continuous process. It is not possible to trace the details of the stages, so subtly and imperceptibly do they pass the one into another. It matters not whether we adopt the theory of preformation or of epigenesis, we cannot say at what moment any particular organ or function comes into play. There were potentialities from the first ; and, given the right environment, they were actualized by a continuous Becoming.

Now the development of the universe can be viewed as just such another orderly unfolding of germ potentialities on a scale of inconceivable vastness in time and space. The idea of an inert material on which a " maker " goes to work is replaced by that of an embryo universe which, in a long series of ordered and continuous changes, manifests a spontaneous growth-power, and brings to the birth the endless variety of forms and functions which multiply around us.

This conception is the antithesis of that of a ready-made machine. Hume's " Dialogues " contain a remarkable passage which antedates modern notions on this matter. " There are other parts of the universe besides the machines of human invention which bear a greater resemblance than this to the fabric of the world, and which therefore afford a better conjecture concerning the universal origin of this system. These parts are animals and vegetables. The world plainly resembles an animal or a vegetable more than it does a watch or knitting-loom. Its cause, therefore, it is more probable resembles the cause of the former than the latter " (Dialogue vii). Hume also speaks of a comet as being an egg of the world-animal.

Is this conception less natural, or less noble, than its disappearing rival ? I cannot think that an unpre-

judiced and reflective mind would contend for an affirmative to this question. Rather does the evolution concept enhance and enlarge the power and wisdom of the Being Who is the Ground and Source of the process.

PROCESS AND CHANGE

The root principle of the concept of evolution is now plain—ordered and continuous growth, or development. All that exists as the result of Becoming, "the whole choir of heaven and earth," is undergoing continuous change. We are back at the old Heracleitean doctrine—everything flows; but with a difference. The flow is not an aimless, endless movement, but a stream with banks, a broadening course, and a definite goal. We may employ Herbert Spencer's terminology, and speak of a passing from the simple to the complex; but we must fill these abstractions with all the meanings and values that are suggested by experience taken in its entirety. And whatever the filling—æsthetic, scientific, idealistic, theological—the essential principle holds good throughout. The universe manifests a perpetual Becoming that is the outcome of inherent powers of expansion and growth.

If we accept this principle, we are liberated from the uninspiring concept of a static universe, as also from the error of regarding the creative process as capricious, fortuitous, arbitrary, sudden, or spasmodic. We see that the kind of actions that go to the making of a watch are misleading and incongruous, when applied, analogically or otherwise, to the phenomena of growth and development. But, be it well noted, we have not abandoned the idea of creation. As Huxley says—"It is very desirable to remember that evolution is not an explanation of the Cosmos, but merely a generalized statement of the method and results of that process. And further, that if there is any proof that the cosmic

process was set agoing by any agent, then that agent will be the creator of it and of all its products, although supernatural intervention may remain strictly excluded from its further course." If Huxley could say this, there is not need for further argument!

SUCCESSION OF CYCLES

Change, then, is persistent and universal, and the processes reveal an orderly succession. A perception of these facts long ago stimulated an interesting speculation. What if the changes are such as to make each stage to be followed by another in such an ordered fashion that there results a succession of cycles which repeat themselves? Those who have examined the literature of this subject know how persistently this idea has suggested itself in almost every age of human history. I need not put in evidence the speculations of the mythological eras of Greece and Rome, nor those of Eastern sages. I would come at once to modern times. Herbert Spencer, as we saw, was more than tempted by it. But one would hardly expect a philosopher so intensely individualistic as Nietzsche to fall under the spell of a theory distinctly contradictory of true individual development. And yet so it was, for at any rate a considerable portion of the most characteristic period of his productive activity. Obscurely, but with deep feeling, he constantly put forward his belief in the "Circle" of Existence—the eternal recurrence of all things—and called it his "abysmal thought." It roused him, now to cheerfulness, now to intense disgust; but he could not shake it off. A commentator on his works doubts if he ever properly estimated the effect of such a doctrine on the minds of men. Certainly that effect cannot fail to be disastrous; for it puts us on an endless treadmill with no hope of deliverance—it sucks us into the depths of pessimism. If change be really change,

there are the conditions for genuine progress. But if, after all our strivings, all our experience of the sordid miseries of life, we have but to look forward to their eternal recurrence, then indeed Nirvana would be a goal worth the winning !

Herbert Spencer's theory, as I showed when this subject was first broached, does not involve, or even allow, this exact recurrence contemplated by Nietzsche. The results of one period of reconstruction would have their effect on the succeeding period of reconstruction, because the intervening period of dissolution could never be absolutely homogeneous ; it would be modified by what had preceded it, and would hand on the modifications. But even so, in the absence of some directive agency, there could be no real advance. What had been, would be, though in some more or less modified form. It is possible, however (as I have tried to show in the chapter dealing with the problem of Beginning), to conceive of a succession of processes of which each has its own special purpose and goal, in and through the eternal activity of a Supreme Creator.

JUDGE BY THE HIGHEST

The study of the development of the elements, or of the behaviour of the amœba is fascinating, and also abundantly fruitful. We there see the problems of existence reduced to their simplest form. And the more we learn of the constitution of matter, and of elementary life processes, in the better position shall we be for approaching more complex phenomena.

But all serious students who are anxious to keep in touch with life as it is lived and with experience as a whole, know well that it is positively irrational to judge a process by its lowest stages. What !—Try to understand the acorn and ignore the oak ! Minutely record the pulings of the infant Beethoven and ignore the

" Choral Symphony " ! The absurdity of such an inversion is the more glaring because emotion, thought, the feeling for beauty, are far away better known to us than the physical forces into which some would resolve them. If we would understand the inner nature of existence and the deeper meaning of the cosmic process, we must lay chief stress on those factors in our experience which transcend and transmute the earlier forms and stages. The true nature of man is not to be found in his embryo, still less in the amœba, but is that which shows us a sufficient ground for his fully developed faculties. *Ex nihilo nihil fit*—we forget this if we confuse historical beginnings with actualized, matured potentialities.

EVOLUTION AND A CREATOR

The cosmic process, as has been well said by a prominent scientist, suggests " the working out of a big idea." To take this view is not to bring ourselves into antagonism with any known facts: it allows us to be whole-hearted evolutionists. But it supplements the bare facts by investing them with meaning and purpose, and makes life worth living. It is not the result of vague longings, irresponsible imaginings, or mystic ecstasies; but of a sober reflection on the most significant facts in our own immediate experience. The curve of life is ever upward—the electron, the atom, the crystal, the cell, the amœba, the dog, the savage, Aristotle, St. Paul. The hypothesis " works." And if the process is the working out of a big idea, there must be a Being Who has that idea and also the power to carry it out. That is to say, there must be a Creator. For the present I stop at this point. What we are led to think of the nature of the Creator will come before us when we examine the inferential import of the highest products known to us—reason, love, conscience, personality, and the like. Our guide throughout will be—*ex nihilo nihil fit.*

CHAPTER III

EVOLUTION—ITS SCOPE

The hypothesis of evolution, in its modern form, is of startlingly recent origin. It had, indeed, various adumbrations of great interest; but it did not gain a recognized status until Darwin submitted to the world the results of his long and arduous investigations. How rapid and triumphant has been its progress! How drastic the revolutions it has wrought! It has been epoch-making in the true sense of that overworked phrase.

It began its phenomenal career in connexion with a single science—that of biology: its scope was restricted to the phenomena of origin and development in the vegetable and animal kingdoms. In the brief period between its promulgation and the present, it has extended its data and its methods until it has been practically universalized. It now attempts to cope with almost the whole of the materials furnished by human experience. It claims allegiance in all the sciences and invades the realms of mind and spirit. On the grandest scale, evolution has come to denote "the process by which the mass and the energy of the universe have passed from some assumed primeval state to that distribution which they have at present," and also the process by which mind and conscience have attained their existing phases of development.

The evolutionist has contended that the world has become what it is by the agency of energies intrinsic in the evolving materials without the interference of external agencies. And his success is chiefly due to the

fact that it is a special application of the historical method. It assumes that if we would "explain" a thing to the satisfaction of the scientist, we must know its causes; and since the causes are in the past, we must learn its history. The power wielded by such a method, rightly applied, is enormous.

ORIGIN OF SPECIES

Darwin's researches were mainly concerned with the origin of species. The old idea was that of fixed types which, save for superficial variations, were permanent: there were supposed to be certain bounds which variations could not pass. The first parents of each such type were believed to have been specially created at some definite date; the particles composing them were somehow supernaturally and instantaneously brought together, endowed with life and with power to multiply their kind.

It is hard to realize that some of us started life with this creed as an exposition of final truth! So strong was the grip of tradition that the resistance to the new doctrine was fierce and determined—so inadequate was the old doctrine that the bonds were burst within the life of a single generation. To sympathize with the opponents of Darwinism, we must study the history of the ideas they defended. Instantaneous creation was a natural conception in times when men had crude cosmological fancies of "making," and when knowledge of physical causation, or of ordered process and law, was almost non-existent; it was the product of a mythopœic age. It happened to be taken up into some of the nascent theologies, and became stereotyped thereby into an article of belief. In modern Christianity, a necessarily imperfect exegesis continued to invest the idea with supernatural sanction. *Hinc illæ lacrimæ.* Our lot is cast in days of less shackled thought, and even

ultramontane divines are carefully preparing the way for an acceptance of this new learning that has proved itself to be so irresistible wherever dogmatism, pure and simple, does not bar the way.

Darwin fought for the idea of a continuous development of life on the globe; he accumulated evidence to show that the barriers between supposedly fixed species could be surmounted, and that the various forms of life had arisen by successive modifications of the offspring of some primitive germ, or germs. Believers in the fixity of species were driven gradually to recognize the indefensibility of their position; and now the general principle of Darwinism passes without serious challenge in the whole scientific world, and in not a small part of the theological. Many of us have further come to realize that the essential idea of creation is untouched. Given the actual existence of forms of life, and the evidence of directivity, the mode of their origin does not impugn the belief in special creative activity. The only change necessary is to substitute the idea of Becoming for that of an immediate spring into existence: the facts to be accounted remain the same.

WHY STRUGGLE FOR GAPS?

The idea of continuity has been generally accepted. But there are still some who make a last stand for the older idea by maintaining that, although the barriers between species have been broken down, there are nevertheless modes of being so diverse that they call for belief in a special creative act. They argue that we have to recognize certain gaps which cannot be bridged, as, for example, between the organic and the inorganic, between man and the animal world. The controversy on this subject may serve a useful purpose in securing due attention to the characteristic factors in each stage of the cosmic process. But I cannot think that the

opposition has any staying power ; it occupies trenches which are becoming untenable. If we reflect, taking quite general ground, we must realize, I think, that this desire to prove gaps is really a doubting of the power of the Creator. A certain degree of development is to be allowed on certain lines ; but there is to come a time when the possibilities on that line are exhausted, and a fresh start must be made. Have we not a refutation of such a view in the simple yet endlessly suggestive bidding—" Consider the lilies how they grow " ?

The main motive which prompts this reservation is the fear that to allow man's continuity with the animal world is to rob him of his dignity. I would urge the counter-thought that to separate man off from the animals, and so from his universe, is to lose the clue to the spiritual nature of the whole. The facts of man's nature are what they are, whatever may be his origin, and have to be accounted for on their own merits. To make him a special creation—even though it be his soul as distinct from his body—is to deny that his essence, whatever it may be, is in any way immanent in his environment. How much deeper is the insight of Emerson, and how much more spiritual :

Striving to be man, the worm
Mounts through all the spires of form.

So too Browning, who declares that Nature was waiting for man's advent on the scene, and that, now man has come to the birth, he casts a glory backward on all that preceded him.

Why not be faithful to the principle which infuses such grand meaning and unity into the cosmic process ? St. Paul did not shrink from such an outlook, when a glimpse came to him of the vaster meaning of the world's existence. He pictured " the whole creation " groaning and travailing together, eagerly waiting for the passing

of the present order into a higher order which he conceives to be " the manifestation of the sons of God."

Guided by such a principle, we can watch how the inorganic struggles towards organization and individualization: how, this step taken, the organic advances from stage to stage, culminating in man. The increasing complexity of organisms furnished a basis for the evolution of mind and self-conscious spirit. It may be that man's " animal " development is not destined to make further strides, or even that there may be deterioration. But the finer materials which serve as bases for subtler thinking and nobler feeling—to the development of these who shall venture to set the bounds ?

CRITICAL POINTS AND CONTINUITY

Although I advocate the abandonment of gaps, I am prepared to admit the force of two reservations to the theory of absolute continuity. One I shall deal with hereafter—the creation of individual germ-centres of the will-to-live. The other finds place in the present connexion—the existence of " critical points " at which new relations usher in new phenomena. It is matter of common knowledge that when water is exposed to a varying range of temperatures it " behaves " in three different ways—at one critical point it becomes steam, below that it is water; at another critical point it assumes the solid form of ice. In each case the transition appears to be sudden ; and certainly the phenomena of gas, solid, and liquid present very different characteristics. The suddenness of the change, however, is largely deceptive ; for increased accuracy of observation discovers intermediate states which go far to bridge over the gaps. Nevertheless, these critical points are suggestive of wider issues, and afford a preliminary hint as to limitations of the principle of evolution.

For the present, let us suppose that the gaps are really

as marked as they appear. Would it be necessary to postulate special creative activity to account for them? And if not, why not? This is the question I would press on those who hold to the idea of special creation in the case of the more striking "gaps" on which they rely. The states—gas, liquid, solid—are strikingly diverse, and bring into existence undoubtedly new phenomena. Why not invoke special creation? I suppose the answer would be that the whole process remains in the physical sphere; in other words, we think we know something of the "how" of the happenings. The real answer is to be found rather in the concept of potentiality. The constitution of the cosmos is such that, given certain conditions, certain happenings become possible.

If we ask the same question with regard to chemical reactions, the same answer is in place. The elements oxygen, hydrogen, and carbon, when uncombined, have each certain qualities and properties which are manifested in "behaviour." When these elements are combined in certain definite proportions, we have starch, or sugar, or alcohol—that is to say, new phenomena appear. Is there need to invoke special creation? No—the constitution of the cosmos is such that when certain conditions are present, the new results follow, in accordance with the inherent powers of the elements.

We now take a further step. Let certain elements combine under special conditions, and protoplasm appears. There is a range of new phenomena—those of organic vital activity. Why should we now be asked to forsake the sphere of nature, and assume special creation? The former account seems to suffice, that, given certain conditions, there will be rendered possible new results, in accordance with the inherent powers of the elements concerned. The potentialities of organic life were there from the start, and were made manifest

when the conditions were fulfilled. The fact that we do not as yet know how to make protoplasm is nothing to the point—it is of merely subjective import.

NO GAPS PROVED

It is safe to say that no sufficient reason has been produced for postulating a break between inorganic and organic, any more than between the physical and the chemical. *A priori* assumptions, not facts, call for discontinuity; and the *onus probandi* lies on those who trust to the assumptions. If we start with the dogma of "dead" matter, then the break must exist. But who has shown us that matter is dead? Start with the antithesis of this, that matter is living (on its own plane), and vital functions can then be viewed as the actualizing of inherent potentialities, nor could there be contradiction of the doctrine that life can only come from life. In the hatching of an egg there is an ordered continuous process resulting in the birth of a chick. How distinguish between the development of the vital functions and the development of the organism? Again, a pair of mice are shut up with access to a supply of grain, and after a time there is a little colony. There is no source of nutriment but the grain, and yet a number of individual, conscious beings have come into existence. Were there breaches of continuity in the processes which took place? Is it not simpler to hold that certain germ potentialities were brought into conditions which favoured their development, and that the vital and psychic factors were evolved continuously with the material? (Concerning the origin of the will-centres I shall speak later.) And so we may regard the universe at large—it is a vast congeries of centres with germ potentialities which develop according to the character of the conditions in which their lot is cast. The process is mysterious, but the mystery is not lessened by postulat-

ing breaks. Rather does the unsupported multiplication of " essences " bring hosts of disconnected difficulties, and obscure the grand vision of cosmic unity.

I hold, then, to the idea of a continuous upward curve. There are no sharp lines of division, but only grades of complexity. On the physical plane we have processes of a comparatively simple character : on the chemical plane, more complex processes producing more complex phenomena : on the plane of life, still more complex processes which culminate in the emergence of self-consciousness. It is these last which reveal most fully the nature and the goal of the process in its entirety, and which therefore reveal most fully the nature and purpose of the Supreme Being Who initiates and sustains it.

LANGUAGE

Illustrations of the evolutionary process are generally taken from the plant and animal world ; nor can we be surprised at this when we remember that Darwinism was the first attempt to give scientific precision and content to the principle of continuous growth. Let us leave, for a moment, the distinctively physical aspects to notice a development which proceeds on the distinctively psychical plane—that of language. Not that language has not its physical conditions—to ignore them would be to forget the continuity which I uphold ; I only mean that its most characteristic conditions are on the higher planes of consciousness and reason, like those of art, morals, and religion.

Language presents a fine example of the evolution of variety from the simplest elements, and has the advantage of illustrating the concurrent evolution of the mental powers. There are divers theories of its origin. One of them would discover it in onomatopœic sounds—rejected by Max Müller as the Bow-wow theory. Another would discover it in interjectional sounds—rejected by

Max Müller as the Pooh-pooh theory. There is also Max Müller's own theory that every being has its own characteristic sound, man among the rest—rejected by his brother philologists as the Ding-dong theory. And so the dust and turmoil of this difficult controversy continue, apparently without result ; but in reality with an elimination of the untenable and a defining of the tenable that is full of encouragement. One conclusion of immense significance is coming steadily to the front—that human language and human reason are developments from the same germ. Further, it is becoming clear that thought did not create language, but that language was a vital condition of the development of thought—that " reason was gradually matured and strengthened through the instrumentality of the representative signs of sensory perception." We are thus travelling far indeed from the crude conception that language was " made "—invented, or agreed upon by social convention !

Starting from primitive roots, however acquired, the growth of human speech has been spontaneous and continuous. As the science of language accumulates data, it becomes easier to arrange the various families of speech in a genealogical tree ; and it is seen that, just as in the real tree, growth brings delicacy of branching and variety of form. Coleridge called Greek " the unconscious metaphysics " of the gifted people who evolved it ; and he thereby marked out two features of prime importance in all human speech—spontaneity and rationality : no language is too embryonic not to manifest these features, though it is given to few of them to attain to the brilliance and subtlety of Greek.

On the physiological side there was development of the vocal organs : on the psychical side, development of reasoning power. The factor of mind was dependent on the lower factor of organic structure. But the result of this interdependence is a new thing—a language. So far

as the physical apparatus is concerned, it happens to be possessed by a parrot; but the bird lacks the element that makes the apparatus a means to a higher phase of evolution—the power of freely and spontaneously using the sounds as signs of concepts. And thus it is never true that *psittacus loquitur*. The inherent Logos has not emerged into consciousness of its prerogatives. Logos! If we study the history and meanings of that word, we shall know what is involved in the evolution of language.

THE KEY TO BECOMINGS

This principle of evolution finds similar illustration in every phase of human life and thought. As with language, so with art, law, government, religion, and the rest, though it has not yet been so completely worked out in these as in Darwinism properly so called. In art, for example, even Ruskin (as F. S. Schiller remarks) had not learnt to apply this illuminating and unifying principle of development; for his criticism, acute and sensitive as it is, does not attempt to trace any organic connexion between the various ideals, styles, schools, and techniques which he discusses. He does, indeed, dwell on historical successions—but he does not give us a story of growth. Since Ruskin's time, however, art criticism has made rapid strides towards bringing itself into line with the science of language, and the results are already of the highest interest. So with the science of law. So even with what is already familiar under the title of the science of religion.

And so throughout. Wherever there has been Becoming, the principle of evolution provides us with a key for unlocking fundamental secrets. And as our skill in using the key increases, so does our confidence in its efficacy gain strength and certainty. For we are learning better how to link up organic and inorganic, physical and psychical, into an all-comprehending and spiritual whole.

CHAPTER IV

EVOLUTION—ITS LIMITATIONS

When it is claimed that the principle of evolution has attained a cosmic scope, it must not be imagined that every form or mode of Being falls under its sway. As I have several times stated, it applies only to Becomings —to processes. Hegel did, indeed, make an heroic attempt to show that existences of all possible kinds, statical as well as dynamical, have their places in an all-embracing system of interconnected dialectical stages; and he framed an idealistic cosmology out of a series of abstract categories of which Becoming was one. His speculations, however, moved in the sphere of "pure thought"; he even brings his cosmology under the head of Logic. Not that he ever loses sight of facts— to say this is to do him grave injustice: but though he struggles manfully to pass from abstractions to concrete individuals, he never really succeeds. Schopenhauer started from a concept too bare to cover the facts of experience—that of Will. Hegel started from the Idea, and tried to evolve the real world by a series of dialectically evolved categories—and he failed for a like reason —existence is more than thought. There is much of highest value in Hegel's system; but we need not dwell on it in this context, for we are taking the facts of experience in their entirety. We can follow him in recognizing timeless conditions for change, but we are postulating that real changes do actually take place in what we call the cosmic process. Our experience gives us real individuals developing in a real time series of happenings in a really changing environment.

A scientific evolutionist, then, must be a realist. But he must not allow his realism to blind him to modes of Being which are outside of and independent of all time processes—nay, which constitute the very conditions of there being a time process at all. These time-modes, which do not become, but simply are, constitute so many limitations to the application of the principle of evolution. Let us consider some of the more important of them and realize their significance for cosmology.

SPACE

What is Space? Let our answer to this deep question be what it may, one thing is clear—Space does not grow: it simply exists. The timeless nature of Space, and its properties, impressed Herbert Spencer more and more as he matured his thought. He wrote thus: "Concerning the multitude of remarkable relations among lines and among spaces, very few ever ask—Why are they so? Perhaps the question may in later years be raised, as it has been in myself, by some of the more conspicuously marvellous truths grouped under the title of the 'Geometry of Position.' Many of them are so astounding that but for the presence of ocular proof they would be incredible; and by their marvellousness, as well as by their beauty, they serve, in some minds at least, to raise the unanswerable question—How came there to exist among the parts of this seemingly structureless vacancy we call space, these strange relations? How does it happen that the blank form of things presents us with truths so incomprehensible as do the things it contains?" * And a little further on he concludes that "Theist and Agnostic alike must agree in recognizing the properties of space as inherent, eternal, uncreated—as antedating all creation, if creation has taken place, and all evolution, if evolution has taken place. Hence

* "Facts and Comments," p. 211.

could we penetrate the mysteries of existence, there would remain still more transcendent mysteries. That which can be thought of neither as made nor evolved presents us with facts the origin of which is even more remote from conceivability than is the origin of the facts presented by visible and tangible things."

This characteristically frank and lucid passage contains an admission from a protagonist of evolution, that the principle of development is not of universal application. Can the question it puts be answered? Only so, I venture to think, if we interpret space in terms of "will and idea." So long as we expatiate on tissues and organs and functions, or on molecules, atoms, and forces, we are in the sphere of movement and Becoming: but behind these phenomena are the fixed relations of space which condition them, and which demand, but so seldom receive, the evolutionist's attention. I agree with Herbert Spencer that these relations are neither created nor evolved. For my own part, I believe them to be self-existent elements in the Supreme Mind. In any case it is obvious that the existence of Space sets a limit to the application of the principle of evolution.

TIME AND CHANGE

A similar train of reflection is aroused when we come to the problem of Time. The scientific evolutionist frequently assumes it without consideration of its implications. How much he misses is shown by the philosophy of Bergson in which criticism of our concept of Time is a leading factor. Define it as we will—take what view we will of its nature—this much is clear, that Time itself is outside the process which gives it content.

Time is linked with Change and Succession: it is not identical with Change—rather is it apprehended in and through Change. And what is Change? It is an ultimate fact in our experience, and, as such, stands

outside the evolutionary process as one of its conditions or grounds. Bergson has insisted that thought can never grasp or explain real Time (Duration) or Change, because Becoming is always continuous, whereas thought advances by successive steps. Still, our apprehension of these concepts is sufficient to convince us that they define limitations of the evolution principle, and that it is uncritical and unphilosophical to ignore their peculiar character, or not to find them a special place in our cosmologies.

LAWS OF NATURE

What is meant by "laws of nature"? I shall discuss these later, and shall contend that they are descriptions of the habits or behaviour of things—manifestations of their inherent powers. But whether this view commend itself or not, we can affirm this much—they are not evolved—they simply declare themselves and are the conditions of the process, not its products. The properties of things are what they are because it is their nature to be such. They may be arranged in new groups of relations, and so reveal new qualities; but the potentialities are there from the first. Process consists in bringing these potentialities into new relations, and so actualizing them. Here, then, we have to recognize further limitations to the principle of evolution. The inherent powers of things are the "given"; they are prior to the process in which they manifest themselves. Evolution, therefore, can never explain them, and their implications must be studied in and for themselves in their relation to the Ground which originates and sustains them.

PROCESS

We then come naturally to the universal point of view, and consider the process *qua* process. After what

has preceded, it is a manifest absurdity to think that it is itself a product of evolution. And yet loose thinking allows us to harbour hazy ideas of this kind—evolution, as I said, is a word to conjure with. Even if we are content with Herbert Spencer's definition of it as a passage from the simple to the complex, from the homogeneous to the heterogeneous, there are implications of direction and goal. If we go further, and see directivity in the process, these implications are strengthened. But however scanty or full may be our conclusions in this regard, the essential point remains, that the process is a result of its conditions, and not the conditions a result of the process.

ADAPTABILITY

To assert, for instance, that " the earth is suited to its inhabitants because it produces them, and only such as suit live," is patently a mere stating of the facts, not the solution of a problem. And yet this statement is gravely made as finally oracular ! On its own ground it is indefensible—it overlooks the fact that organisms to a considerable extent can modify and conquer their environment. Conscious effort and purposive volition have played no small part in the drama. But the big question, of course, is this—How comes it that the earth favours the survival of these particular organisms ? The evolution principle cannot answer this question—but that is not to say that it should not be asked ! Over and over again Darwin personifies nature ; and he does so because he cannot help himself ; for behind the process is the totality of its conditions. Adaptability leading to " fitness " is a primary quality of protoplasm. We may explain much by applying this truth to the phenomena of development in the organic sphere. But whence and why this quality of adaptability ? If it be referred to the universe at large, then we still ask—

Whence and why? Remember Huxley's acknowledgment—"There is a wider teleology which is not touched by the doctrine of evolution, but is actually based upon the fundamental proposition of evolution." Huxley was clear-headed, and was honest with himself as well as with others; and he therefore did not hesitate to recognize that a process cannot initiate itself—that it has a background which is not only a legitimate, but a necessary object of study if we would account for our experience in its entirety.

PSYCHIC FACTORS

When we consider the psychic factors in the cosmic process—consciousness, will, feeling, reason, and the like—we discover some very subtle difficulties. In one sense they have "developed," in such fashion that we can speak, for example, of "the evolution of mind." But when we study them more deeply, we can see that it is wellnigh impossible to conceive that, in and for themselves, they can develop. Consciousness, for instance, has degrees, but—Can it grow? So with feeling and will—Can they grow? Still more so with reason—the source of the processes with which logic deals—it seems absurd to think that it can come into being by stages. Is there a way through the tangle?

Certainly it is no solution to call consciousness an epiphenomenon, like the shadow of a train as it travels along; but the very propounding of such a theory is a proof that there are special difficulties to be met. May we not put it thus? These psychical factors are present in their fullness in the Ground of the process, and are transmitted or transfused into the centres of the will-to-live in accordance with the stage of development they have reached. The extent of their presence is thus conditioned by the process, but their existence is independent of it. A man with a dull brain cannot under-

stand the reasoning in the *Pons asinorum*; a Newton thinks it self-evident. The underlying rationality of the proposition remains unaltered, but the conditions of its assimilation are different. These psychic factors are thus seen to be conditions of the process, not its product: their absolute existence constitutes a limitation of the principle of evolution; their manifestation in the process depends on that principle.

From another point of view we arrive at the same conclusion. Science deals with "objects"—phenomena. But these psychic factors are not "objects" in the scientific sense of the term, and cannot therefore be regarded as evolving or developing. Consciousness is an immediate experience which defies analysis or description. Reason, so far from being an object, is the faculty which makes the apprehension of objects possible. Will is not an object, but the subjective putting forth of energy. Feeling is not an object, but a wholly subjective experience. What the scientist observes, then, is not a development of these mental factors, but a development of the objective conditions of their insertion (so to speak) in the cosmic process. The mental factors themselves exist outside the process, and are infused in the degrees appropriate to the structural fitness and complexity of the organism.

RELATIONS

Everything that happens, or exists, has relation to other things and happenings. The relations dealt with in the Geometry of Position, which so powerfully arrested Herbert Spencer's attention, are but examples from an inexhaustible number—likeness and unlikeness, equality and inequality, succession and coexistence, nearness and distance, upper and lower, father and child, buyer and seller—and so on *ad infinitum*.

Now what is the nature of these relations? Some say

they exist solely in the mind; others that they have objective reality. But there they are; they exist as facts in our experience, and demand recognition in our cosmology. One thing is clear, they are not evolved in the scientific sense: they do not grow; they simply manifest themselves when certain conditions are fulfilled. They are manifested in the process, but are not immersed in it, and therefore constitute further limitations of the evolutionary principle.

IDEALS

Singularly noteworthy, in this connexion, is the existence of ideals. The scientist is apt to regard the process as wholly pushed on from behind, after the analogy of physical causes. The present is to be wholly the product of what has existed in the past. But here are influences which pull from the front! They are based, indeed, on the experience of the past, but they anticipate the future. They forge ahead of the given facts, so that what does not yet exist has a large share in moulding the present. In fact, it is not too much to say that, when once self-conscious beings have been evolved, ideals are the soul of progress.

In a certain sense, like consciousness, will, reason, and the like, they may be said to be evolved: they gain in fullness and breadth as the process advances. But what about *ex nihilo nihil*? If man is never satisfied with facts as they are, but condemns them, inspired by the glow of what "ought to be," we must find an adequate basis both for the dissatisfaction and for the ideal which prompts it. And thus, from another side, we are led back to the Ground, and to see in It, not only the source, but the goal of the process.

We thus come into sight of a new phase of cosmological speculation. Our ideals, in so far as they are rightly framed (liability to error being common to them

and to scientific formulæ) are based on ideas in the Supreme Mind—ideas, therefore, which are prior to the process, and which condition it throughout. In other words, the cosmic process not only has its source in the Supreme Being, but its goal. The directivity we discover is the working out of these pre-existing ideas ; and as we gain in the power of fully conscious self-determination, we gain also in power of apprehending these ideas, and of shaping our course in accordance with them. For us, the ideal represents an unattained future towards which we consciously strive ; for the Supreme Being it represents a predetermined goal. We here discover the most fundamental of all limitations to the principle of evolution—a limitation which is to be further discussed when we come to consider how God is a Creator.

The existence and influence of ideals helps us to understand the relation between a time order and the order that is out of time. When a seed falls into the ground and germinates, there result a series of developments which issue in the fruit. But there was a background to the process without which there could be no development at all : and that background contained the idea of the end towards which the plant was always striving. Apply this to the Cosmos. In the time order, there is advance from stage to stage : the forces push from behind—the present is the outcome of the past. But prior to the process are the ideas in the Divine Mind ; these pull from the front, and define the course of the process and its goal, so that it moves majestically and irresistibly on to the " far-off divine event " which was in view from " the beginning."

MIND AS THE PRIUS

I have but given instances out of a much larger number of limitations to which the principle of evolution

is subject. Time, space, law, consciousness, will, reason, relations, ideals—each of these has its special characteristics as a fact of experience; but they one and all agree in being prior to, and external to, the process in its aspect of Becoming. It is one of the most encouraging signs of the times that thinkers are more seriously concerned to understand their nature, and their functions, as presuppositions of their being a process at all. Our chances of achieving an adequate cosmology are improving accordingly. The necessity under which we find ourselves of searching for unity in the manifold of our experience tends to a recognition of mind as the fundamental reality. It is impossible to subsume these presuppositions under physical categories; whereas it is easy and natural to see in the physical the presence of mind. And since the facts imply a Ground, we infer that this Ground is the Supreme Mind.

PART III
PHYSICAL FACTS

CHAPTER I
MATTER

When we look out on our universe, the overwhelming fact presented to us with most immediacy is the existence of what we call Matter. From the hugest blazing sun down to the infinitesimal atom, all physical things alike are built up, particle by particle, out of Matter—all alike are manifestations of this inevitable reality.

So overwhelming is the impression, so imposing and persistent are the phenomena, that many of the deepest thinkers of the world (Plato being not the least) have set an eternally existing Matter over against the eternally existing God, and have held that it dictated limits to His creative activity. Others have felt that they need not postulate a God at all, and that to explain the universe it suffices to observe and describe the configurations assumed by what is presented to our senses. Dualism and Materialism, if not dead, are moribund. Nevertheless the fact that they have for so many centuries exercised so strong a fascination over many minds is proof that the cosmologies they have suggested must contain truth of enormous cosmic significance and of primary dignity.

MATTER AS A BASIS

I therefore begin the consideration of the facts of existence in their cosmological bearings by taking account

of that which seems to be the most fundamental of all, and ask what, in the light of modern discovery, we are to think of the nature of Matter. I reserve for later study its rôle as a factor in the higher products of the world-process.

There are some who call Matter "brute," or "dead." With these, as will be seen, I am at decided issue. But I readily grant that, of all the modes of Being known to us, it stands on the lowest plane. Avoiding metaphysical subtleties, and taking it in its usual meaning, it is evidently the substance out of which the phenomenal world is constructed. It is remarkable how, in many languages, the idea of a substance out of which things are made is contained in words that signify "matter." In Greek, for example, *Hyle* meant forest wood in its natural condition; but it also meant cut wood, or timber prepared for some special use. In Latin, *Lignum* is rough wood for fuel; but *Materia* is timber for constructive purposes. In our own language we still speak of "raw material" and of "building materials"—that is, material which is to be worked up into definite form. And it is only a refinement of this idea when reflective thought universalizes it, and denotes by "Matter" the supposed substratum underlying all physical things—that in which properties inhere—the basis for physical phenomena in their endless variety. This concept is valuable as far as it goes, but falls short in regarding matter as passive and changeless; whereas I shall contend that it is active and endowed with inherent potentialities.

CHIEF THEORIES OF MATTER

The theory of matter which has lasted longest and been most potent in cosmologies is that it consists of solid indestructible atoms. It comes down from the days of Democritus, and still has a place in chemistry in spite of the fact that it has received its mortal wound

at the hand of the physicists. The individual, indivisible, indestructible atom of the older physics has gone, never to return. Let us trace some of the steps by which the newer views have been reached, and so gain some insight into the nature of Matter from the physical point of view.

ARE ATOMS MANUFACTURED ARTICLES?

Sir John Herschel affirmed, and Clerk Maxwell endorsed his view, that atoms are "manufactured articles." Maxwell held that "science is incompetent to reason upon the creation of matter itself out of nothing. We have reached the utmost limit of our thinking faculties when we have admitted that, because matter cannot be eternal and self-existent, it must have been created." Now much depends on what Maxwell here means by "created out of nothing." This phrase is obviously in contradiction with the idea of "manufacturing"—for manufacture suggests a "making" out of pre-existent materials. But more of this important issue hereafter. Maxwell probably used the "out of nothing" uncritically, adopting the popular conception of creation.

If atoms are in any sense manufactured, out of what are they made? Lord Kelvin attempted to answer this question by his Vortex theory. He speculates that matter consists of rotating portions of a continuous incompressible fluid pervading space. A vortex atom once generated will rotate for ever and ever, and will always consist of the same portion of the fluid first set in motion. He holds that such an atom can neither be divided nor destroyed; and that we thus arrive at the fundamental properties of matter—individuality, indivisibility, and indestructibility.

This theory certainly does not give us "matter" in the old sense. For the substratum (the ether) is a mysterious frictionless fluid which only acquires the properties of matter by being whirled into vortices. That

is to say, it only becomes matter by virtue of the forces which have acted upon it. Force (or, rather, energy), not matter, becomes the dominant concept (see Appendix B). The theory marks a stage in the disappearance of the old solid atom.

We see, then, that the accepted qualities of matter tend to be attributed to force. Boscovich was a physicist who was bold enough to abandon altogether the idea of solid particles and to substitute for them geometrical points which are centres of force. These centres are supposed to exist in various relations of attraction and repulsion; and their particular activities would then depend upon the intervals which separate them. Matter, as distinct from force, is politely bowed out.

HERBERT SPENCER

Herbert Spencer's speculations are not far removed from this. He holds that matter does not possess that extended solidity which we attribute to it when we perceive it by our senses. He conceives that when we reduce it to its simplest form, it is a kind of antithesis to empty space, and that where we perceive matter we really perceive resistance. In other words, he reduces matter to being a manifestation of force, and holds that our conception of it is built up out of our experiences of that force. Again we find that matter, in its usual sense, is bowed out. I may at once say that I am in accord with this line of speculation. But let it be clear that this is poles apart from regarding the material world as nothing but ideas existing in minds. As force, it has a real existence external to the percipient. On the other hand, this force may itself be psychical.

These new theories are obviously subversive of the older concepts. Whether we incline to them or not, this much at any rate seems to be indisputable, that we only know matter through motion. When we see it, our optic

nerves are affected by vibrations of the ether: when we hear it, our auditory nerves are affected by the vibrations of the air: when we smell it or taste it, certain nerves are affected by chemical vibrations. And thus even those who are unwilling to renounce their belief in solid matter as a persistent substratum have to acknowledge that, apart from force, it is unknown. So true is this, that most scientists ignore the supposed substratum, and reduce it to "systems of forces." The fuller implications of this will be studied when we come to treat of Energy.

RADIOACTIVE BODIES

As is well known, the discovery of radium has from another side wrought a revolution in our ideas of matter. What is known as the atom is found to be a vastly complex storehouse of energy. In each atom is locked up the force represented by a number of free electrons whirling at inconceivable speeds in the bondage of a harmonious and orderly system. Radioactive bodies allow us actually to watch a disruption of the constituents. For in these substances the atoms are in unstable equilibrium, and it is by changes in their own internal activities that the disruption is brought about. We can neither hasten nor retard the process, nor is it apparently affected by anything that takes place in the environment. Year after year, century after century, continues the marvellously measured but sure disintegration. Each corpuscle flying off from a radium atom bears with it an electron, or is itself an electron, and the disruption is attended by the dissipation of an almost incredible amount of energy, considering the magnitude of the particles which manifest it. "Matter a thousand times finer than hydrogen is ejected in torrents from the self-pulverized atoms."

We must not imagine, however, that these electrons are only found in radioactive bodies. They occur in

flames; near all very hot masses; wherever light falls on metallic surfaces; they are generated by Röntgen and other rays; they are the agents in electrical transmission—in fact, they may fairly be said to be ubiquitous.

Even the cautious physicist, Rutherford,* deems it probable that radioactivity is a universal property of matter. "It does not seem unlikely that an atom may undergo disintegration without projecting a part of its system with sufficient force to ionize the gas. . . ." The experimental results in Appendix A strongly support this point of view. "It may thus be possible that all matter is undergoing a slow process of transformation which has so far only been detected in the radioelements on account of the expulsion of charged particles with great velocity during the change."

What is the cosmological significance of these astounding discoveries? One thing seems certain—if the atoms are breaking down, they must have been built up. Of the process of building up we as yet know nothing, but the inference holds good. Some speculate that at an indefinitely remote epoch in the past they had their origin, and that at an indefinitely remote epoch in the future they will be dissolved. Others incline to the view that the waste and decay are somehow continuously compensated by constructive processes in the universe. In the light of modern astronomy, the latter hypothesis is the more probable, and more in harmony with the concept of continuous creation which I shall advocate and maintain. But in any case we are confronted by the possibility that what we call matter is really a storehouse of vast quantities of energy (see Appendix C).

ATOMS AND EVOLUTION

I would substitute, then, for Maxwell's term "manufactured" the term "evolved." Atoms disintegrate—

* "Radio-Activity," 2nd edit., p. 499.

they must therefore have been built up. Instead of being primary entities, they are the result of process, and cannot claim any unique privilege in regard to their mode of Becoming. The study of dissociated matter in the hottest suns gives us more than a suggestion that the atoms known to us come within the sweep of the evolutionary hypothesis—that they exist by virtue of their being, out of a host of possible atoms, "the fittest to survive."

To claim that atoms are a product of the evolutionary process is not to say that they are the outcome of fortuitous movements and combinations. For the familiar periodic relations of the so-called elements manifest unmistakable co-ordinations, and are being rapidly fitted into an orderly system by those who devote themselves to this fascinating branch of research. Even on this low plane of Matter we meet with evidences of plan and design—evidence that steadily grows in clearness as we mount the scale of Being which has Matter for its basis.

INDIVIDUALITY OF ATOMS

A feature of the older atomic theory is the doctrine that all atoms of the same kind are exactly equal and similar. This might be so if they were "manufactured articles"; though even in that case it would be improbable. But when once we accept the hypothesis that they have been evolved and are complexly constructed, the improbability comes to a head. The inexhaustible variety of nature manifested in the things that are within reach of our senses affords strong *a priori* grounds holding to variety throughout. Moreover, atoms, in their disintegration, pass through various stages, under the influence of changes in themselves and in their environment. At no two points in space are the stresses and strains alike, and at every point they vary indefinitely from moment to moment. The atoms, therefore,

that are subjected to these stresses and strains must have corresponding differences in their states, and no two of them can be alike.

It may be objected that chemists have weighed the atoms, determined their respective valencies and gravities, and have found their mathematical calculations work out with exactness. The answer to this is easy. The atoms are so infinitesimal that they can only be dealt with in vast multitudes: the individual escapes notice: atomic weights and gravities merely state averages, like the statistics of insurance societies. And though single atoms, and even single electrons, can now be isolated and measured in various ways, it is obvious that the results must be approximative only.

Whatever, then, the atoms may be made of, it is improbable in the highest degree that they are turned out to exact pattern. We have to recognize in them, on their own plane of being, true individuals—changing constituents in an ever-changing world. They are born, grow, decay, die—their being is so far analogous to that of individuated organisms. The judgment, therefore, that we pass on the process as a whole will apply in its degree and measure to the atoms. And if we find that the universe as a whole cannot be called "brute" or "dead," neither can the atoms be so condemned. The plane of their being is low; but they are within the process, not external to it; they are a living part of a living whole. To say this is not to degrade the world of living things, but to dignify the world of Matter.

THE ETHER

There has long been a tendency among physicists to suppose that all the elements known to chemists are different structures of one ultimate kind of matter. The study of radioactive bodies is furnishing evidence of the truth of this speculation. The alchemist's dream of the

transmutation of metals is again with us ; but it is now more than a dream ; it ranks among the soberly accepted aims of science.

But what is the ultimate ? This is now generally regarded, not as matter of the kind hitherto recognized, but as something which passes beyond the range of known physical characters—be it electricity pure and simple, or be it, as is most generally held, the Ether (see Appendix B).

The Ether ! How shall we gain any clear conception of this impalpable, invisible, self-contradictory and yet almost universal postulate of modern physics ? Its qualities are so negative that it eludes our reasoning powers, still more our scientific apparatus. It does not impede motion—it does not arrest, absorb, or scatter light—and yet this entity (can we call it substance ?) is doing the work of the cosmos. It is thought that matter consists of it, and that to it matter returns.

This elusive entity has been forced upon us by many sets of phenomena which postulate its existence. And in turn, it has suggested many speculations about the nature of matter. Lord Kelvin's was noted above—vortices in a perfect fluid. I will mention one of the most recent, most strange, and yet most plausible of more recent theories, in order that it may be realized into what unexpected regions we are travelling. This theory regards the ether as composed of ineffably small, ideally rigid grains. (Where is the perfect fluid ?) When these grains fit into one another there is what we call empty space. But when a misfit arises, space is no longer in this sense empty ; we have the phenomena of resistance and so forth, to which we give the name of matter. And then comes a startling conclusion based on these premisses. We know that as a wave at sea moves on, there is no onward movement of the particles of the water, but only an onward movement of the

form ; so that the wave is never at two consecutive moments composed of the same particles. So, according to this theory, a misfit in the ether can be propagated endlessly from one set of grains to another—there is no transference of the grains, but only of the misfit. And thus it follows that if I move from one place to another, my body never at any two consecutive moments consists of the same matter ! It is a special kind of wave (so to speak) moving in ether !

Such a theory seems fantastic—almost bizarre ; and yet it is a responsible pronouncement of a most able and accredited physicist. Moreover it is one which appears to give some explanation of certain phenomena of gravity and electricity hitherto not satisfactorily accounted for. Can we wonder that scientists have passed away from the hard matter-of-fact attitude which was so characteristic of the reign of the hard matter-of-fact atom ?

MATTER AND ENERGY

Here is a passage from an eminent French physicist : "Heat, electricity, magnetism, universal attraction, cohesion, chemical affinities, all those existences which are called mysterious and incomprehensible, are only at bottom hypotheses of co-ordination, useful without doubt in our present ignorance, but which the progress of true science will end by dethroning, and will refer and reduce to the ether."

This passage is typical of the trend of physics, and of the fundamental place now occupied by the conception of the ether. But it does not go far enough to show the true state of the case. The ether itself is but another co-ordinating hypothesis which gives unity to the phenomena of heat, magnetism, and the rest. The most fundamental of all physical concepts is evidently Energy (see Appendix B). Magnetism, attraction, repulsion, and the other phenomena mentioned are manifestations

of force ; and we are thus led back to something on the lines of the theory of Boscovich—that the physical universe is a huge system of forces acting at points in space. Thus viewed, the ether is not something acted upon by force (as was supposed to be the case with the otiose solid atom), nor is it the generator of force. It is Energy itself, pure and simple.

If there are any of my readers who still cling to the substratum, I press my point that it is not merely unnecessary for physics and science—it is also unknown. And as I wish to keep to the facts of existence, I may be allowed to pass it by without prejudice to my argument. For myself, I am content to regard Matter as a special manifestation of Energy ; and to the consideration of Energy I now proceed (see Appendix B).

CHAPTER II

ENERGY

Modern physics tends to ignore the existence of matter as ordinarily defined. Some physicists go so far as to deny its existence. Poincaré states their position clearly. They assert that "the old world of matter has no real existence, and that energy is sufficient by itself to give us a complete comprehension of the Universe, and of all the phenomena produced in it." * Whetham thus briefly traces the development of this speculation: "In extreme opposition to the hard impenetrable sphere of Democritus, we have Boscovich's idealistic conception of atoms as centres of force. This theory gave too little scope for definite development to serve permanently as a useful working hypothesis, and, in face of the phenomena of atomic radiation, it too seemed insufficient. It is worthy of note, however, that Faraday, in his day, and Lord Kelvin, at the present time, have advocated views differing but little from those of Boscovich; while the school of chemists, who would banish from their ken all atomic theories, regard energy as the only physical reality known to us, and matter as 'a complex of energies which we find together in the same place'" (see Appendix B).

Ostwald is a well-known champion of the new Energetics. He claims to have shown † that "all physical phenomena can be represented in terms of energy"; and points out that when we grant the possibility of transforming the various kinds of energy into one another, we "are enabled to see the common bond which

* "The New Physics," p. 67. † "Energie," French trans., § 83.

unites ponderable matter to the imponderable forces." Nay, he is so thoroughgoing that he sketches out the application of the doctrine, not only to the sphere of life, but to those of psychology and sociology.

MODES OF ENERGY

For some time past, physicists have made the assumption that the various " forms " of energy are not different energies. They have distinguished kinetic energy, heat energy, energy of elasticity, chemical energy, electrical energy, magnetic energy, radiant energy, and the rest; but they have found by actual experiment that these are one and all convertible in one another—can be transmuted, or transformed into one another. For example, the energy of burning carbon is converted into heat; this heat can be used to drive an engine, and is converted into motion; this may again by friction be converted into heat, or can be set to generate electricity: the electricity may be reconverted into motion and haul a train, or be made to appear as heat and light in an arc lamp: and so on indefinitely. Theoretically, indeed, these results may be otherwise presented, in a way which will be plain from a simple illustration. A man presents a five-pound note at a bank, and gets five sovereigns in exchange; there is equivalence, but not transmutation. So, it is said, a condition of getting so much electricity is the burning of so much carbon—that is, the expenditure of so much heat. But the heat may be only a condition to be fulfilled before we get the electricity; there is equivalence between the amount of heat expended and the amount of electricity obtained; but there is not transmutation. It may be granted that such a view is theoretically allowable; but there is no evidence of its validity: and until some proof is advanced, we are justified in taking the phenomena as we find them. At a later stage I shall maintain that

the same attitude is eminently reasonable in passing from the phenomena of physical Energy to those of Life.

I assume, then, that the scientist's view of transmutation holds the field, and that we are justified in looking upon Energy as the common ground or source of all modes of force. The differences in the modes are due to differences in relations established between various portions of the Energy—just as an atom of oxygen and two atoms of hydrogen, while apart, have certain characters, and present quite different ones when chemically united : new relations have been established. This principle of new phenomena arising from new relations is of enormously wide application, and is, indeed, fundamental to the evolutionary process as a whole.

But let us not be deceived by a false simplicity. We may reduce all modes of force to one ultimate mode—but the differences are still there, demanding recognition and compelling us to speculate as to their origin and significance. A cosmology is not complete when it has discovered a unity in differences ; for the differences are determinate, and are as real as the unity. Why does Energy now appear as light, now as heat, now as electricity ? Why should there be the particular kinds of motions which these produce ? Why do the forces build themselves up into definite forms, such as chemical elements, molecules, and so upward through all the wealth of ordered contour and function displayed in the universe ? We cannot shirk these problems if we would be true to the facts in their entirety.

QUALITY AND QUANTITY

Can we account for the fact of colour as distinct from vibration by referring it wholly to the subjective side ? Surely not. There must be differences in the objective modes of existence correlative with the differences in the subjective—and these must be qualitative as well as

quantitative. Science deals with quantities—it weighs, measures, counts. But it cannot deal with qualities. It can measure differences in the light-waves of red or of yellow; but it cannot explain why the one set are perceived as red or the other as yellow. Still less can it deal with Wordsworth's

Light that never was on sea or land.

Energy, existing simply by itself, would always be bare Energy, and would never be manifested as anything but Energy. Physics stops short at this. Hence, though its achievements are splendid, they are limited; and it is folly to imagine that by counting, weighing, measuring, we shall ever be able to explain the properties of Energy which, when related to sense perception, make the world what it is to the percipients. The modes of Energy have qualities as well quantity.

THE CONSERVATION OF ENERGY

A main pillar in the temple of science (a pillar now rudely shaken!) is the doctrine of the conservation of Energy. Some, like Herbert Spencer, think that without its support the whole edifice would crumble. And yet in spite of the strain it is supposed to bear, it is undeniable that it has never been anything but an unproved assumption, accepted by an act of scientific faith. It is not my object to undermine its authority as a working hypothesis, but only to question its claim to be an ultimate postulate (see Appendix D).

The doctrine is founded partly on the phenomena of transmutation just noted—partly on a dogma that nothing which exists physically can ever be anything but physical; can ever have come into being, or ever cease to be. Neither of these contentions is sound without the presupposition that nothing exists but the physical. The transmutations may, or may not, involve

exact equivalence in terms of Energy; but even if we decide for exact equivalence, this would only apply to the Energy that might be in actual existence at any given time, and in no way decides the question of the becoming or disappearing of that Energy. Suppose the Ground of its existence to be a personal will, then the amount would vary in accordance with the purposes of that will. As for the dogma, it must remain a dogma until evidence is produced to give it true authority. I am prepared to be loyal to the dictum *ex nihilo nihil*. But *ex nihilo* is in no wise asserted by rejecting the proposition that all existence on the physical plane always has been, and ever must be, physical.

The force of these somewhat abstract reasonings is much increased by the fact that the doctrine is being cruelly assailed in the house of its friends, the physicists! Waiving a detailed discussion, I will take an example from an already mentioned theory of the ether—I refer to that conception of it which makes it granular in structure, and regards matter as the result of misfits in the grouping of the grains. Now if this theory has any truth in it, energy need not be conserved. For whenever any of the misfits are adjusted, a corresponding amount of energy will at once disappear!

For those who maintain the continuity of the ether, a similar conclusion lies in wait. The apparent discontinuity would arise from the varying action of strains and stresses in the continuous medium. These stresses and strains may neutralize each other, like interfering sound waves—and again, energy will disappear. On either of these suppositions—continuity or discontinuity—the universe might be likened to "an iridescent fountain leaping up and falling back into the etherial reservoir."

In anticipation of the view for which I shall contend, I may say that these difficulties cease to trouble us if we lift Energy into the psychical sphere, and regard it as a

manifestation of Will. For then the amount of Energy actually in existence at any given time will depend on psychical factors and can be connected with purpose.

THE DISSIPATION OF ENERGY

Less emphasized, but almost of equal interest, is the doctrine of the dissipation of Energy. Many scientists cast a gloom over cosmological speculation by assuring us that Energy is constantly running down to lower levels—is being "degraded"—and that the goal of the process is universal death. Among philosophers, von Hartmann has seized on this "happy thought," and welcomes it as one of the greatest boons that science has conferred upon us!

If work is to be done, there must certainly be difference of intensity—there must be a "gradient" of some sort. For instance, if the temperature outside and inside an engine boiler were the same, the piston could not move—there would be no surplus of energy to run down to a lower grade. So with the universe. It contains an indefinite number of differences of intensity, and these are continually running down to lower levels. As the number decreases, the possibilities of movement (and *a fortiori* of life) become less and less. When the level is uniform, all processes will cease.

Suppose this doctrine to be true on the physical plane, and that there is nothing but the physical plane, then we might well despair. But if we can once see reason to believe that the Ground of the physical is the psychical or spiritual, the outlook is changed; for then the running down would simply mean that the physical order had done its work. But we are not called upon to go so far as this: for we have here another instance of an august doctrine being wounded in the house of its friends. There are scientists who maintain that even though Energy may be a constant, the universe has some means

of continuously re-establishing the inequalities of intensity which it is continuously losing.

In both cases, that of conservation and that of dissipation, it is the limiting of the outlook to the purely physical plane that is the initial source of confusion. With the facts of our psychical and spiritual experience before us, we may repudiate this limitation. And so we find no less a philosopher and scientist than Wundt flying straight in the face of those who urge the universal equivalence of transmutations, by maintaining that the outcome of our activities on the higher levels is the positive increase of spiritual energy. He points out that as men learn to co-operate more perfectly, and severally and collectively achieve spiritual triumphs, the richer and fuller flows the stream of spiritual life. He calls this the law of the increase of spiritual energy.

Yes—the concepts of scientists are abstractions, miserable and bare in comparison with the richness, the fullness, the manifoldness of life. Life is richer, fuller, and more manifold than the contents, not of physical concepts only, but also of the whole of human thought. I say this, not to depreciate science, but to put its conclusions in their right perspective.

ENERGY AS WILL

Matter is resolved into Energy: and Energy is immaterial—the scientific antithesis to Matter. We have only to take the further step which has already tempted us, and we are in the sphere of mind. The very imponderability and contradictory properties of the ether plead strongly for a recognition of its psychical nature. It would then come to this—that what is objectively Energy is subjectively Will: or, in other words, that manifested Energy is the visibility of Will. And the inference is strengthened when we reflect that we are dealing, not with quantities only, but with forms and

qualities—that is to say, with specific and determined modes of Energy which argue directivity and purposive plan.

The inference becomes wellnigh an assurance when we remember that Energy is not an original conception. It is derivative. It is historically undeniable that it has arisen from a depersonalizing of human will, and that it implies a direct experience of a sense of effort. The scientist has travelled far from the crude anthropomorphism of primitive thought. But it remains true that if we disconnect the concept of Energy from all reference to our own experience as beings who "will," we reduce it to emptiness, and it becomes meaningless.

I conclude, then, that whatever form Energy may take, it presents itself to us as will in relation to will. At a later stage I shall produce reasons for a further conclusion, and I shall argue that Energy and Will must be identified. For the present I simply insist on the psychical element in our concept of Energy, for it carries us, at the very outset of our inquiry, beyond a purely materialistic view of what is called the physical universe.

QUALITY AND FEELING

I have pointed out that the modes of Energy are manifestations of quality as well as of quantity; that this fact transcends the range of Physics; and that quality is related to feeling. It is not Will alone, then, that is involved in our experience of Energy. We come in sight of pleasure and pain, scales of value, æsthetic judgments—a whole range of psychical factors which are not amenable to quantitative measurements, but which are dependent on relations between the modes of Energy and the states of individual conscious centres. Strictly speaking, from the purely physical point of view, there is no such thing as heat or cold—simply changes of movement in molecules: no light and dark—simply

variations in the undulations of the ether: no such thing as sound or silence—simply changes in vibrations of the air: no such thing as sweet or sour—simply the play of diverse chemical affinities: and so on through the whole gamut of perceived responses to external stimuli. Thus, when we look into the matter more closely, we find that heat, cold, light, sound, and the rest, as perceived by us, are the full realities from which our concepts of the modes of Energy are abstractions, representing a part only of a composite whole.

It is assuredly a strange perversity, or blindness, which has contented itself with such abstractions and ignored the full experiences from which they are abstracted! Some there are who would explain this myriad-hued existence of ours by "matter in motion"—meaning by "matter" that which is known as such to science. The insufficiency is grotesque. Very different was the tenor of Tyndall's meditations in sight of the summit of the Matterhorn, when he saw in matter (or shall we now say Energy?) the promise and potentiality of all forms and of all the qualities of life. But here the vital issue turns on what is involved in "promise and potentiality." I hold to the dictum, *ex nihilo nihil*, and maintain that, in their complete context, the various modes of Energy—heat, electricity, magnetism, and so forth—stand revealed as modes of psychical energy; otherwise they could not contain the potentialities already realized.

A passage from Lotze is admirably to the point: "What lies beneath all is not a quantity which is bound eternally to the same limits, and compelled through many diverse arrangements to manifest always the same total. On the contrary, should the self-realization of the Idea require it, there is nothing to hinder the working elements of the world being at one period more numerous and yet more intense; at another period less intense as

well as fewer. Then the course of Nature would be like a melody, not flowing in monotonous uniformity, but with crescendos and diminuendos as each in turn is required to express the meaning of the whole."

ENERGY TRANSCENDS THE PHYSICAL

Taking Energy, then, in the full context of which it forms an indivisible part, we have little difficulty in concluding that the world, physically described in terms of matter and force, is a specialized product, or manifestation of a power which, in its inner significance, is constituted by psychical and spiritual relations. Stresses and strains in ether can thus be viewed as stresses and strains in the interactions of wills; and all the wealth of forms and qualities as causes and effects of the interplay of mind with mind. Our creation problem begins to reveal its true significance and proportions.

CHAPTER III

MECHANISM AND MATERIALISM

I HAVE ventured to say that Materialism is bankrupt, but that its persistence through so many centuries proves that it has emphasized truths that are of profound cosmic significance. On this latter count I devote a chapter to its influential but inadequate cosmology.

Let us, in the first instance, be fair to modern Materialism by acknowledging that, historically viewed, it marks an almost inevitable reaction. It was born into a world full of preconceived ideas which were out of touch with reality: which were backed up by august pronouncements of an infallible Church: which rendered dissent highly dangerous, and foreclosed free inquiry. Acute but prejudiced and fettered thinkers had formulated a rigid system which largely covered the ground of science as well as of philosophy and theology. Anthropomorphic crudities mingled with metaphysical abstractions blocked the way for those whose intellects were awake and who wanted to get at facts. The Ptolemaic astronomy, for instance, was part of theology. Can it be matter of wonder, then, that the process of emancipation was slow and painful, and that it was accompanied by grievous bitterness and exaggeration?

We have to take into account, moreover, the effect produced by the meteoric advance of modern science when once launched on its fateful career. Frail mortal minds might well be dazzled and their balance disturbed. Mathematical physics and chemical formulæ were deemed sufficient to explain everything. The scientist became so objective (as he imagined!) in his methods,

that he forgot himself, the framer of those methods—forgot his own reasoning power, his purposeful activity, his æsthetic, moral, and spiritual experience, and regarded the world, and himself as part of it, simply as a machine. Yes—the reaction has been prolonged and severe, but it has spent its strength, and the facts of experience in its entirety are coming to their own.

VALUE OF MATERIALISM

What has Materialism effected ? Its main aim was to trace back life and thought to what is called the physical basis : to quote a famous statement, we were called on to believe that thought could be secreted by the brain as the liver secretes bile. Mechanical forces acting on highly complex molecules would explain our most exalted feelings and the most subtle workings of our minds.

This aim was chimerical ; for matter in motion can never give us more than itself, and the very concepts employed were but arbitrary abstractions from the full reality, products of the activities they were to explain. Nevertheless the exaggeration has had its use. It has brought philosophy and theology down from the rarefied ether of *a priori* assumptions and of systems cunningly constructed of dialectic abstractions—down to the world of factual experience. After all, life has a physical basis, and the physical aspects of the cosmos are not apart from the spiritual, but are an integral and essential factor in a living whole. The material universe is not separated off, under a curse, from man and his destinies, but part and parcel of the Reality which conditions and underlies his being and his development. The remedy has been drastic, but, failing milder febrifuges, has been effectual.

REACTION AGAINST MATERIALISM

The inadequacy of mechanics as a complete explanation of existence is too patent to need lengthy exposition.

To put the matter briefly, the mechanical theory is a product of brain processes: but brain processes are supposed by the theory to be simply molecular movements: that is to say, mere motion generates a theory to explain itself! In other words—mind does not exist, and frames a theory to prove that it is non-existent! Well may Mach, a scientist of the first rank, write thus: "Purely mechanical phenomena do not exist . . . are abstractions made either intentionally or from necessity, for facilitating our comprehension of things. . . . The science of mechanics does not comprise the foundations, no, nor even a part of the world, but only an aspect of it."

This pronouncement is clear evidence that the reaction against materialism is in full swing, even in the sphere of pure science. The causes at work are complex and irresistible. The most potent perhaps is this. It is increasingly seen that mechanics, the first of the sciences to be developed, deludes us by a sense of false simplicity. Its formulæ apparently reduce the manifold of experience to order and measure; but in reality they leave untouched wellnigh all that makes the phenomena what they are.

The delusion could not last when once the glamour of the supposed simplicity of mathematics and of pure physics had begun to wane. The mechanical aspects of the universe never present themselves alone. A picture by a master contains a world more of matters of experience than extension and mass and vibration; and, indeed, the purely physical properties and relations hardly come into consciousness at all unless for some specialist who fixes his mind upon them. The colours, lights and shadows, the figures—men, women, children, cherubs—appeal to æsthetic and sentimental emotions. And what is true of any work of art is true, in its degree, of every object which is perceived by us—yes, is true of

the physical formulæ themselves which would never be formulated did not feeling prompt their authors. Can we wonder that, as human knowledge gains in extent and depth, the rich fullness of life rises in rebellion against the bare, soulless cosmology of the materialist? Thank heaven, the nightmare is over! The dead weight and oppression which made Huxley shudder fall away, and men are free to expatiate as living souls in a living Cosmos!

SCIENCE UNDERMINES MATERIALISM

As I have pointed out, in treating of Matter and Energy, science itself is not the least of the agencies responsible for the downfall of materialism. Startling discoveries and revolutionary speculations are shattering the edifice that seemed so complete and so solidly established. Moreover, there is a growing realization of order and purpose as the general trend of the evolutionary process, in its parts, and as a whole, becomes more apprehensible. A chance concurrence of atoms and forces could only give a passing unity; whereas the determinate disposition and ordered results of the forms of Energy are forcing themselves on the attention of those who try to co-ordinate the various branches of human knowledge.

Look where we will, we see the current of the intellectual and spiritual life of the race deepening its channel as well as widening its sweep:

the banks fade dimmer away,
And the night wind brings up the stream
Odours and sounds from the infinite sea.

Think of the work, it has been said, of the Galileo to whom the mechanical theory is primarily due, and it will be easier to believe in the Galileo yet to be.

A WRONG START

Most of the serious thinkers of our day are beginning to suspect that a wrong start has been made—that the

delusive simplicity of mechanical categories has inverted the true order in which we should approach the big problems of the universe. The study of atoms, of energy, of matter in motion—these were taken to yield results that were ultimate ; whereas the true ultimates are to be sought in the psychical sphere—in consciousness and purpose. For the sake of an *ignis fatuus*—an impossible simplicity—the really fundamental aspects of existence have been neglected or ignored. Cosmologists have described a machine when they were face to face with a world glowing with spiritual life. They have even dubbed as an epiphenomenon—a meaningless and useless by-product—the mind which enabled them to speculate at all. It is time we tried to undo the mischief wrought by devoting ourselves more steadily to the higher phenomena which alone can supply a key to the problems that have vexed, and ever will vex, the hearts and thoughts of those who would learn more of the Why, the Whence, the Whither.

FUNCTION OF MECHANICAL CONCEPTS

There is an undoubted reaction against materialism. But we must beware of letting it go too far ; otherwise we fall back again into dogmatisms, or lose ourselves in the nebulosities of an irresponsible mysticism. Although we are amply justified in denying that physical concepts can suffice to explain our experience, they nevertheless have an immensely important function of their own to which it is folly to be blind. They serve, more especially, to orientate us in our efforts to thread the mazes of sensible phenomena ; and thus their discovery marks stages in the development of human knowledge and of civilization. We may compare them to our tools which become more perfect as our wants and our inventions grow in number and complexity.

In comparing physical concepts to tools, we have

more than an analogy, we have an identity of principle. Among others, William James has insisted strongly on this point, and says of these concepts that they " are all translations of sensible experiences into other forms, substitutions of items between which ideal relations of kind, number, form, equality, etc., obtain, coupled with declarations that the experienced form is false and the ideal form true, declarations which are justified by the appearance of new sensible experiences at just those times and places at which we logically infer that their ideal correlates ought to be." That is to say, they are a reconstruction of certain aspects of nature which, as the pragmatist phrase goes, are found to work. They are true so far as they lead to correct and useful results, and they demand our recognition in so far as they actually enable us to attain those results.

It follows that though these concepts are only provisional and are ever changing, we must be guided by them, not only from a utilitarian standpoint, but in framing our cosmologies and in essaying their interpretation. They are but approximations to the reality after which they strive; but they represent an outcome of our efforts up to date. We have confidence that we are on the right track in proportion as we are able to coordinate them, and according as they give us power to predict the future. If it is insisted that we cannot attain to the ultimate truths behind these physical concepts, I reply that neither can we jump out of our own skins to find them. We must go to work with the best tools we possess. More especially if we are believers in evolution, we shall be ready to give them respectful heed as the best available means of attaining to truths more complete and more comprehensive. There are locks in the temple of the universe which physical concepts can never turn: but we should not therefore lose a chance of getting

to the inner chamber by disdaining to unlock the outer doors.

Again, we must be careful not to shackle scientists in their applications of the mechanical theory. There are some who are quite happy so long as the workings of a steam-engine are submitted to physical examination, but who are restive if the workings of the human mind are similarly treated. Why should this be? Has not the human mind its mechanical aspects, dependent on the physical processes of the brain? If the mechanical principles which are apprehended in the working of engines are found to have a wider sphere of application than we imagined, there is nothing to affright us; for the higher phenomena do not thereby cease to be what they are, or to present peculiar characteristics and properties which transcend the physical. The days of *a priori* fettering of scientific research ought to have passed for ever. Our wisdom now is, first, to show that mechanism cannot explain everything; and, secondly, to prove that even mechanism, as the materialist conceives it, is more than mechanism—is itself a spiritual factor in a spiritual whole. In short, to demonstrate that, unless it is spiritualized, science itself is impossible.

If timid philosophers and theologians could but take a wider view they would realize that it is only by a whole-hearted attempt to work out the mechanical theory to its furthest limits that its insufficiency can be made plain. Preconceived theories on their part are as dangerous as are premature conclusions on the part of the scientists.

MECHANISM AS A MEANS

Two competing views of the universe are genuine contradictories and annihilate each other. The one, the ultra-materialist, sees nothing but mechanism working in accordance with impersonal and universal natural

laws: the other, the ultra-spiritualist, repudiates mechanics altogether, and sees everywhere and always the direct action of a Divine Being. Are we really impaled on the horns of a dilemma so grievous? By no means is this the case. For we may hold that a Personal Creator, always and everywhere working, uses mechanism as one of the means for attaining His purpose, and that He guides a process which, in the unfolding of its potentialities, at an initial section of its upward curve manifests itself under mechanical aspects. By such a doctrine we can harmonize the otherwise irreconcilable antagonists—the materialist and the ultra-spiritualist. For, on the one hand, we do not need direct special intervention from moment to moment, nor do we refuse to mechanism a share in the cosmic process; on the other hand, we recognize the continued activity of an immanent Creator. This doctrine, which thus commends itself by virtue of its mediating power, will be seen to gather force as we advance in our inquiry.

CHAPTER IV
CAUSATION

For the problem of Creation, the concept of causality is central. The universe manifests itself to us as a series of changes ; and as our knowledge of it grows in extent and intimacy, the more vividly do we realize that phenomenal existence is a constant flux—the more in sympathy are we with the ancient sage who likened it to the flow of a river into the stream of which we can never step twice, for the water changes from moment to moment.

Now the mind of man is so constituted that wherever we see change we seek for a cause. And there are many who find a special charm in the mere linking together of ascertained facts so that they shall form a connected chain of causes and effects. This desire to get at the causes of happenings is persistent, in spite of the fact that we can only hope to arrive at what are called the " proximate " causes. We can only follow up the chain so far, and can never come into view of its beginning. Nevertheless, we hold on our way undaunted, and ceaselessly search for links not yet discovered.

This craving is in itself a highly significant fact. When we consider that man is not separate from the universe, but an integral part of it, his seeking to trace causality is the universe seeking to explain itself in and through that which is its most highly developed part. There is something in the nature of things which at once stimulates and satisfies the craving.

The concept of causation, then, is not an innate idea which we apply to phenomena that are external to it ; nor is it an arbitrary construction of our imagination

which we foist on phenomena. It is immanent in man because it is immanent in the cosmic process as a whole. Man is changed by his environment, and in turns works changes in it—there is reciprocity of action and reaction —the subjective acts of man's will are in living relation with the play of the forces that act upon it from without. We start, then, with positing the validity of the concept of causation. Wherever we see change, we are justified in seeking a cause for that change.

BECOMING AND AN UNCAUSED CAUSE

But granting the validity of the concept, can we universalize it, and insist upon applying it *à outrance*? Not so. We evidently cannot apply it to existence, as such, but only to change. For if there is to be change, there must be something which undergoes the change; change cannot itself produce that which changes. That would be equivalent to Nothing producing Being. Even Hegel dared not to posit Nothing as his ultimate category, but set Being alongside of it to arrive at his synthetic category Becoming. We are therefore compelled to think that there is self-existent Being, the Uncaused Cause of change.

Spinoza tried to save the situation by speaking of ultimate Being as *Causa sui*—the Self-caused. But this is clearly illegitimate, for it implies Becoming; and not only so, but Becoming out of Nothing. Or if this be denied, then the expression is an unnecessary and mystifying synonym for the Self-existent, and it obscures the real issue. Far better is Aristotle's idea of a Cause which produces movement, but does not itself move. But in any case, my main point holds good, that the ultimate Ground of the cosmic process simply exists, and that its existence cannot be subject to the causal law. We need not trouble further with the foolish question, What is the cause of the First Cause? But we

may, and do, ask, What is the nature of the Self-existent ?

What is the nature of the Uncaused Cause ? It is one of my main objects to determine this. I will anticipate my argument thus far. We are in quest of a Ground of change, an Uncaused Cause of movement. Are we not straightway, by the very conditions of the problem, urged to pass beyond the sphere of the physical into that of the psychical and spiritual ? I was tempted to take this step when considering the nature of Energy, because we can only apprehend the meaning of the concept by an appeal to our direct experience in the putting forth of effort. Here again there is the same leading, only greatly strengthened. For we know that our will, though itself physically unmoved, is a cause of movement.

POTENTIALITY

But a difficulty presents itself. If the Self-existent is to be the Ground of all that exists, then nothing that does not actually exist can ever come into being. And yet here is the phenomenal world, as presented in our experience, which is not only a scene of continuous change, but of continuous Becoming—a process. Apparently we are face to face with a serious contradiction. Abstract concepts, logically treated, cannot help us ; they simply juggle with the difficulty. Science can only describe the process. An appeal to actual experience, however, comes to the rescue.

To recur to a previous illustration. Let us suppose we are watching Dürer as he etches a picture, and let us neglect all the accessories to fix our attention on the working of his æsthetic impulses. His imagination has conceived a subject and he proceeds to embody it in material form. He works by stages—outline, shading, various processes, finishing-touches. In short,

there is a process which results in a completed picture. But the result, though in a sense a new thing, existed potentially in the mind of the artist, and is what it is because the artist is what he is. Again, the artist does not cease to be himself because he has projected part of himself, externalized himself, so to speak, in his picture. So far as his creation is concerned, his mind may be called an unmoved cause of change. We are thus enabled to see, in a dim sort of way, how an Uncaused Cause may project itself in a cosmic process without ceasing to be itself. The significance of human creative activity will be further considered in a later chapter.

We have introduced the idea of potential existence, but we must be careful not to abuse it. There are some who manipulate it in such a fashion that they make themselves and others believe that the cosmic process may be self-evolving, without any reference to an ultimate Ground. They thus unwittingly commit themselves to a crude form of the doctrine *ex nihilo*—a doctrine which science cannot tolerate. For unless the aid of *ex nihilo* be involved, a lower mode of existence, in and for itself, can never be deemed capable of evolving a higher. If we define matter, for instance, in terms of physics and chemistry, we must not smuggle into our concept of it, under the guise of a potentiality, a power of evolving life, and still less consciousness, emotion, or reason. For myself I believe these potentialities are inherent in matter ; but my belief rests on the supposition that beneath the potentialities there is a Ground which, as an Uncaused Cause, has projected them from its own fullness of being. They are actualized, it is true, in a time series ; but all that is historically unfolded in their actualization pre-existed in the Ground in some such sense as the picture pre-exists in the mind of the artist.

We thus see why science cannot give ultimate explana-

tions in terms of cause and effect; for tracing back the chain *ad infinitum* never gives us the Self-existent from which the chain hangs. The more perfectly science pursues its quest, the more imperative does it become to postulate a Being Who shall be the Ground and Cause of the potentialities which are being actualized in the cosmic process.

CONTINUITY IN CAUSES AND EFFECTS

When we use the metaphor of a chain of causes and effects, we must be careful to realize its inadequacy. Links are separate things; and although they are conjoined, they retain their individual existence. Now it is a popular habit to think there is a similar separateness in causes and effects, and to regard them as a series of happenings of which each has an individual existence in its own right. There is a truth in this view—for individuality, as I shall show later, is a fact that must be reckoned with. But there is another side to the matter. We soon discover, when our analysis is more thorough, that there is no such thing as a series of separate happenings—the cause is not one thing and the effect another: the one passes into and becomes the other by a continuous process. The universe of to-day is the universe of yesterday at a further stage of development. The successive changes grow out of one another by the actualizing of potentialities which have a definite character and which take a definite direction. For our own convenience we divide the process up into sections. We mark them out, as Bergson puts it, like points on a line; but the process itself knows no such points—it is a continuum.

Moreover, the process acts as a whole; there is no single cause, or group of causes, for producing a single effect, but the whole universe is at work in each and every one of its parts. A fire is burning in my grate.

The cause, it may be said, is my desire for warmth. But how quickly, when we are not superficial, we are launched out into time and space! Why do I want to be warmed? Because it is late autumn, and in England at this season the temperature is not high enough to enable me to dispense with a special source of heat. But why is it autumn? Because our planet is so inclined in its orbit that its various zones receive the sun's rays at different angles in the course of the year. And why this inclination? Because the structure of the fire-mist out of which our solar system condensed was such that this particular configuration resulted. For my own purpose, I single out the cause which is personally interesting to me—I am chilly, and I cause the fire to be lighted. But when I am thorough I cannot stop short of the totality of things; and I find that for the kindling of my fire I must take into account the whole past history of the solar system, which is, again, merged in the history of the universe—the universe in its entirety, whether in time or space.

The physical unity of the cosmos is generally recognized. The fall of a pin alters the centre of gravity of the whole minus the pin. We are beginning to understand that its spiritual unity is no less complete, and that it is indefinitely more significant. To apprehend this universal continuity is, with Blake,

To see the world in a grain of sand,
And heaven in a wild flower,
Hold infinity in the palm of your hand
And eternity in an hour.

THE UNIVERSE AN ORGANISM

For myself, I am more than tempted to regard the universe as an organism. I am well aware of the objections to using this term in other than biological contexts. We can be too timid, however, in extending its applica-

tion. For what is an organism? One excellent definition is this—a complex in which the parts exist for the sake of the whole, and the whole for the sake of the parts. The heart, without the body, cannot beat; the body, without the heart, cannot live—the interdependence of whole and part is obvious. It does not require too great a flight of imagination to see in the interdependence of the universe and its parts the mark of the presence of a vital unity pervading and dominating a process of development. But more of this hereafter. Suffice it now to point out that a principle of organic unity characterizes the causality manifested in the cosmos.

This principle of unity enables us to understand why effects are not always like their proximate causes. The brain-cells of a Jellicoe issue an order to join battle at sea, and the vast resources of a modern fleet are set into action with results that stagger humanity. A little dog tears up a manuscript, and the concentrated mental powers of a Newton have to retrace calculations on which depend conclusions of great import for the advance of human knowledge. Geese cackle, the Capitol is saved, and the course of history is changed. These instances are not examples of chance combinations of events, but are due to the action of the whole system of things. Nor are they the outcome of different kinds of causes which are brought to bear on a particular happening. For practical purposes we distinguish between such causes as force, will, reason, love—but in reality there is only one cause, the cosmic process which embodies certain of the inner activities of the Uncaused Cause.

SCIENTIFIC CONCEPT OF CAUSATION

With these conclusions before us, we can set in its right perspective the scientist's conception of Cause. He fixes his attention on those phenomena which show connexions of a supposed invariable character—sequences

which are so regular that they lead to generalizations known as "laws of nature." Because of their observed regularity and invariability they lend themselves to measurement and calculation. A type of such happenings is the action of a machine which turns out so much of some definite product in accordance with the expenditure of so much energy. The value of scientific generalizations is undoubtedly enormous, both theoretically and practically. But we must not forget that even machinery has other than physical aspects. Think how its rapid development in the last century has altered the economic, the social, and the religious life of the civilized world!

The value of the scientific concept is undoubted, but it is partial. And all attempts to make the standpoint of the scientist the sole one to be taken are just as undoubtedly harmful; for they blind us to the claims of other and higher standpoints, and empty life of its deeper significance. Those who work with the microscope tell us that in examining a tissue, or similar object, it is not good to use only the higher powers, but that we should sometimes substitute the lower, lest we lose sight of relations to surrounding tissues. So with the varied tissues of human knowledge. The specialist in physical research can be so immersed in the study of some special strand that he forgets it is in vital connexion with other strands. Nowadays the danger is perhaps decreasing; but it still calls for constant precaution. It may be noted, in passing, that the principle involved in the microscopist's precept should be duly heeded by specialists of every class—economists, artists, philosophers, theologians, and the rest.

EFFICIENT AND FINAL CAUSES

Among his four classes of cause, Aristotle distinguishes between the efficient cause and the final cause—between the causes which do the work and those which lead to

the work being done as means to the accomplishment of purposes. The distinction has a place, though not so well defined or so fundamental as its author imagined. It serves, however, to bring into relief the insufficiency of the concept which lays exclusive stress on the efficient cause. Certain forces are at work in Nature, and, in accordance with certain laws, produce definite and calculable results. But this is not the whole story. Our experience teaches us that the forces may be used for the accomplishment of purposes.

Let us revise Paley's argument from a watch. A watch is a machine and argues the existence of a watchmaker. We cannot, then, account for the watch without taking account also of the watchmaker. If we regard him, in turn, as a machine producing a machine, we think of his activities of muscle and brain, and the succession of causes and effects which these imply. But what set going the machinery which produced the machine? The watchmaker has desires which impel him to earn a wage. And why does he make a watch? Because he knows there are people who want to tell the time. Now the watch is part of the universe—but so is the watchmaker. The existence of the watch, therefore, argues the existence of purposes in the universe.

To the consideration of purpose and design in the universe I shall devote a special chapter. I allude to the subject here because I want to insist that the scientist, while he has undoubtedly a right, for the fulfilment of his own special purpose, to limit himself to the physical aspects of the machine and its making, has no right to ignore the non-physical aspects of these phenomena—the wants and desires which the making fulfils. Indeed, if he aims at an adequate cosmology, he must be more heedful of the final causes than of the efficient, for they go down deeper into the nature of things, and manifest higher grades of Being.

CAUSATION

THREE FORMS OF CAUSATION

Let us follow up the idea that there are different kinds of cause by considering a classification more modern and more fundamental than that of Aristotle. Schopenhauer contends that causation has three forms—cause in the narrow sense, stimulus, and motive. The first of these, cause in the narrow sense, is that with which science is concerned. It is that in which the effect increases directly in proportion to the cause, and therefore also the reaction. That is to say, it is in accordance with Newton's third law of motion, the equality of action and reaction. It thus lends itself to measurement and calculation, as in mechanics, chemistry, and so forth. The second form of causation, stimulus, is that which is manifested in the reactions of living matter when affected by external forces. To this, Newton's third law does not apply, for the reaction is not in proportion to the effect, and measurement and calculation are not possible. It is characteristic of all organized bodies, as such; in the plant and animal worlds it brings about changes which are peculiar to vital functions—we have left the sphere of physics to enter that of life. The third form of cause, motive, is still further removed from the physical type, and its effects are manifested in conscious beings when they are influenced by psychical activities arising from their own internal experience: it supposes the existence of knowledge and reason.

Schopenhauer points out that no sharp line can be drawn between the second and the third forms. He instances the case of breathing as being "a mixed function," depending partly on voluntary activity (motive) and partly on nerve processes which are beyond our control (stimulus). I venture to urge that no sharp line can be drawn between the first and the second forms, because I hold that, since the first are also psychical (though on a low grade) they cannot be funda-

mentally mechanical. Schopenhauer holds that physical matter is Will, but that it is Will which has no knowledge, which does not, therefore, respond to stimuli, but acts in accordance with universal, unchangeable laws. His Will is originally blind—this I cannot grant. I argued (see "Atoms," p. 95) that the alleged equality of action and reaction is an assumption founded on averages gathered from phenomena which are too minute to allow of individual examination.

I am thus in a stronger position than Schopenhauer for maintaining, as he maintains, that the three forms of causation are fundamentally one. I hold, with him, that they all depend ultimately on Will, as being "the inner nature of everything in the world and the one kernel of every phenomenon." But I hold no less firmly that the Uncaused Cause, Will, is essentially purposive throughout, and can therefore never present itself in forms which are simply and purely physical.

CAUSALITY AND HISTORY

Having dealt with causality in its lowest form, I turn to its higher forms, more especially as manifested in History. Science cannot deal with history—not merely because of the complexity of the phenomena it presents, but also, and chiefly, because it cannot repeat itself. There is causality behind it—it has its physical conditions—but it reveals modes of causation which quite transcend the utmost resources of the scientist.

There is causality behind history. Hegel made a magnificent attempt to show the main principles of its development; and his arguments and conclusions, if not fully convincing or final, are suggestive in the highest degree. But the principles he discovers are removed by a whole heaven from the categories of the physicist—they include these (for Hegel never blinked facts), but they indefinitely transcend them. It would

be out of place to discuss these principles here ; I merely mention them as an instance of constructive work that essayed to deal with experience in its entirety.

I said that history cannot repeat itself. There is a popular saying that affirms such repetition, but it is only popular and cannot for a moment bear close scrutiny. Earlier phases may recur, but always with added elements and in new contexts—there is continuous process. The British Empire cannot reproduce the Saxon Heptarchy—the man cannot become the boy—no organism can live its life backwards. There is evidently here something at work which is not in accordance with physical concepts. It is supposed, indeed, that atoms, in chemical reactions, can revert to earlier states. Atoms of oxygen and hydrogen, for instance, unite to form water : the water can be resolved again into oxygen and hydrogen : and the conversion, backwards and forwards, can be repeated at will, without any change, it is said, in the constituent atoms. But I gravely question this. I am not willing to grant that physical matter presents any exception to the principle that all change is forward, and will not admit of strict reversion. What proof have we for saying that the atoms which pass through a series of chemical actions and reactions are not changed in the process ? The modifications may be there though they escape our notice, and may have their share in determining the onward course of the history of the Cosmos. I should be prepared to argue this on general grounds ; but the case is enormously strengthened now that we know the atom to be a highly complex system of forces. But I will not insist on this. For the profoundly significant fact remains that the phenomena of life and of psychical experience cannot be reversed. Causation is such that it produces incessant change incapable of repetition—an onward movement which cannot be reversed. Its highest products are seen in the intellectual and social life of man,

which bring into existence ever new and fuller values. Physical concepts are powerless to explain these—they point onwards and upwards—they suggest imperatively some

far-off divine event
To which the whole creation moves.

CAUSATION AND AN ABSOLUTE

One further point before we leave this subject of causality. I have maintained that the causal series compels us to postulate an Uncaused Cause—that an eternal regress of mere causes and effects is not only unthinkable, but contrary to reason; for the changes must have a self-existent Ground. Shall we call this Ground the Absolute? Not so, if we are to avoid another irrationality. For an Absolute must be defined as Being which exists out of all relation. But a Being which is a Cause must stand in a definite relation to that which It causes. And thus, as has been well said, an Absolute Cause is a contradiction in terms, like that of a circular triangle. If the Ground we postulate is to be all-inclusive (as we require it shall be) it is true that it cannot be conditioned by any existence external to itself. But this is not to say that it cannot have a determinate character; it is not to defecate it into a transparency. However much more it may be, it must at least possess sufficient determinateness to be the Cause of the universe of our experience.

I prefer, therefore, to avoid the use of this illusive and unworkable concept of an Absolute. I simply maintain that there must be an Uncaused Cause—a Self-existent Being—capable of projecting, so to speak, such a universe as ours, and of initiating and sustaining the process by which it reaches its goal. By analysing our experience, by making clear its implications, we learn something of the nature of that Cause, and of the methods and the meaning of the products of Its creative activity.

PART IV
LIFE AND MIND

CHAPTER I
CAUSATION AND WILL

The possible identification of Energy and Will has come before us at various points in what has preceded. Let us now pursue this subject into somewhat fuller detail. We cannot hope to arrive at demonstration; but if the cumulative reasons for adopting the identification are numerous and weighty, scientists, as we have seen, are not in a position to deny us a working hypothesis. They live in glass houses, and must be careful how they throw stones.

A billiard ball is struck by a cue—the ball moves. The cue is moved by a player who handles it with the intention of making the ball move. The process is continuous from the intention to the movement of the ball. We say that the cue exerts force on the ball—that it overcomes its resistance. Are we to say the same of the volition which leads to the movement of the cue? We are in sight of the recondite problem of the connexion between mind and body, into which I do not propose to enter; I want to keep to the direct deliverances of experience. Have we any reason for separating the conscious purpose from the physical result? I cannot believe that the strange theory which denies to consciousness any share in the causation of the happenings can ever secure a permanent place in philosophy. At any rate, in common with the great majority of my readers, I refuse to take it seriously.

Taking the series of happenings as it stands—volition, movement of cue, movement of ball—we may regard it in two ways. Viewed objectively, from the outside, there are simply the happenings; and if we restrict ourselves absolutely to the objective standpoint, we know nothing else. But viewed subjectively, from the inside, we infer that a real process has taken place in a sphere outside consciousness, and that the cause which set it going was a definite act of purposeful will.

CAUSE IS OBJECTIVELY UNKNOWN

I said that objectively nothing is known but the mere fact that the series "happens." This may seem a bold statement. But Hume's contention that, in any sequence of phenomena, we never perceive a cause, is irrefutable on its own ground. The cue moves—the ball moves; there is all that can be known from the outside. Whence, then, comes our conviction that there is a causal connexion between the two events? From the direct experience the player has that he puts forth effort to move the cue. It is not, as Kant would have us believe, that we subjectively supply a category to the phenomena: but that we have a direct experience of force exerted at one end of the series of happenings and intuitively infer that force is at work throughout. The subjective factor is the key to the whole situation. For the force which the player exerts, and of which he is conscious, is preceded by a volition; and unless we assume an unbridgeable gap, it is at least reasonable to infer that the force throughout the series is of the nature of will.

But it may be asked, Why not approach the problem from the other side, and infer that will is of the nature of force? We are here on ground which Schopenhauer has made peculiarly his own, and it is only fitting that he should give us the answer to this question. "If we

refer the concept of force to that of will, we have in fact referred the less known to that which is infinitely better known ; indeed, the one thing that is really immediately and fully known to us, and have very greatly extended our knowledge. If, on the contrary, we subsume the concept of will under that of force, as has hitherto always been done, we renounce the only immediate knowledge which we have of the inner nature of the world ; for we allow it to disappear in a concept which is abstracted from the phenomenal, and with which we can therefore never go beyond the phenomenal."

In trying to apply this argument, we find it natural to recognize will in the animal world, and have no great difficulty in recognizing will in the plant world. The doubt comes in when we pass to the inorganic sphere. But our hesitation, I am convinced, springs from preconceptions due to the overemphasizing of physical concepts. We recall how that, long ago, Empedocles interpreted physical attractions and repulsions by referring them to the principles of love and hate. He was not hampered by a load of theories which make of Nature nothing but a lifeless, meaningless machine. If we modernize his thought, we can recognize will in the building up of the crystal, in the vibrations of the magnetic needle, in the wealth of chemical affinities, in the mysterious and universal sway of gravitation—in short, in every phenomenon that manifests definite form and action. We have a principle, based on the facts of immediate experience, which gives unity to the cosmic process as a whole.

If we reject this principle, what have we left ? Nothing but the conception of Energy, which apart from our experience of effort is a pure abstraction. Causes, said Hume, cannot be perceived—and who shall refute him ? There would remain nothing but the observing and classifying of certain more or less regular sequences

of happenings which have no inner bond of connexion that can be known to us. Of course we may assume such a bond; but, deprived of its basis in the facts of experience, it is a pure assumption which can claim no allegiance.

IDENTIFICATION OF WILL AND FORCE PERSISTENT

The identification of Will and Force is proved to be natural by its persistency. We might instance the universality of early Animism, the language of the poets, and the speculations of many of the greatest philosophers. I lay chief stress, however, on the fact that, in spite of the hold obtained by frigid mechanical theories, there has arisen a new Animism which is championed by many of the most powerful among modern thinkers.

The wider issues of modern Animism must be reserved for the chapter on Life; but it will be helpful to glance at its bearing on our concept of force. Coleridge has an illustration which brings us to the main point. He observes that the verses—

> *Behold yon row of pines that shorn and bowed*
> *Bend from the sea-blast, seen at twilight eve—*

contain little or no poetry, if rearranged as a sentence in a book of topography or description of a tour. But the same image, he says, rises into the semblance of poetry if thus conveyed:

> *Yon row of black and visionary pines*
> *By twilight glimpse discerned! Mark how they flee*
> *From the fierce sea-blast, all their tresses wild*
> *Streaming before them.*

The difference in the two presentations is obvious—the second goes further in suggesting that the movements are akin to those familiar in human experience. But

why the difference in the effect upon the mind? A certain author has written a book to prove that man is nothing but a machine. He interprets this illustration from Coleridge in terms of physical concepts, and holds that the added vividness is caused by the fact that "the visual and motor centres contribute to the creation of the image." There is a partial truth in this: from the physiological and psychological standpoints there is, no doubt, a contribution from these centres to the total impression. But if we postulate nothing but mechanical concepts, we must keep to them; and then we see how curiously inadequate such an explanation is! How should a piece of machinery find added pleasure and interest because certain parts of it work in new combinations? Still more, how should parts of it be stimulated to subtle feelings of kinship and sympathy with other parts? The truth is, of course, that the start is made from the wrong end. The central fact is the percipient mind, one activity of which is the capacity for responding to stimuli from what are called the motor centres. And the real problem is to explain why these stimuli should produce a sense of kinship and sympathy.

FISKE'S ILLUSTRATION

As it happens, a similar illustration is chosen by Fiske in his "Cosmic Philosophy." Now Fiske is a philosopher who cannot be accused of lacking scientific knowledge, or of being unduly prejudiced in favour of psychical or spiritual views of the universe. I give the substance of his paragraphs on this subject.

A tree is blown by the wind. Primitive man, seeing the boughs waving, concludes that some agent like himself is at work. He calls it Hermes, or Boreas, and erects temples in which he propitiates it by prayer and sacrifice. This is the first stage. As knowledge increases, the wind is no longer regarded as a conscious

agent, but is still thought to put forth effort to move the boughs. This idea of "effort" makes the second stage fundamentally continuous with the first; but the crudities of primitive anthropomorphism fall away. The third stage is the scientific. It omits not only the idea of conscious volition, but also that of effort. It measures the momentum of the wind and its effects, and simply postulates the action of uniformly conditioned forces. It would seem to have eliminated the human factor altogether.

But the use of the term "momentum" (says Fiske) shows that the event is still regarded as a manifestation of "force." (I would add the use of the term "inertia," which implies resistance to be overcome.) Now what do we mean by "force"? Perhaps not an *occulta vis*. But none the less it is a generalized abstraction from the sensations of muscular resistance. And thus from first to last we have to admit that our subjective feelings are the only materials with which our conception of the wind can be formed. The consciousness of effort remains throughout, and can only be abolished by abolishing consciousness itself.

How forcibly Fiske corroborates Schopenhauer's contention! And how striking is this substantial agreement between the German idealist and the English disciple of Herbert Spencer! It must assuredly be a very full and strong counter-argument that should induce us to forsake an analogy from human experience which so persistently asserts itself. The principle of causality, broadly viewed, is the outcome of a demand on our part that everything shall be rational. Can we find a more rational basis for it than the experience we have when we put forth a definite and conscious effort? Thus viewed, the cosmos becomes a manifestation of Will definitely and consciously directed towards the attainment of ends, and the cosmic process reveals to us the methods employed for attaining those ends.

EFFORT AND DARWINISM

We are all familiar with Darwin's now classical phrase —" the struggle for life." It is true that some of his followers have tried to water down its obvious implication, and to make it mean no more than action and reaction of the physical or chemical type. But it is hard to think that this will satisfy any one who is not obsessed by a determination to drive recklessly through the facts of experience, heedless of those which do not make for foregone conclusions.

Bonnet, the Genevan naturalist, set himself to watch the ant-lion, and to discover how he ejects, from the funnel he digs, bodies (stones or grains of sand) which are too heavy for him to throw out with his horns. I translate freely : " Does he then abandon the spot he had chosen and go elsewhere to set his snares ? or does he remain quiet in his excavation with the stone which he cannot pull out ? or does he manage in the end to get rid of it, and, for this end, what means, what force does he set to work ? " He does not abandon the spot, but perseveres in efforts to carry the stone away. " From moment to moment the load is ready to fall, either to right or left, or even to roll over the back of the insect : it is only by lowering or raising certain portions of his rings that he is able to keep it on his back. Despite all his efforts, however, and despite his skill in tricks of equilibrium, sometimes the stone escapes him, and rolls to the bottom of the funnel. The ant-lion is not discouraged ; he resumes his work, shoulders anew the stone, redoubles his skill and his strength, and succeeds at last in reaching with his load the top of the precipice. . . . I cannot say how much the ant-lion, while engaged in this heavy toil, interests the spectator."

Who shall deny that we have here a manifestation of dogged will ? What degree of consciousness may accom-

pany the efforts made is a delicate psychological question—there must be some degree—but the presence of will-power is unmistakable. And hence the absorbing interest the naturalist found, and the sympathy he felt, in watching the insect. Let us follow up the trail.

ORGANISMS ARE NOT PASSIVE

Haeckel contends (" History of Creation ") that living matter is urged by two impulses: a centripetal, which tends to preserve and transmit the specific form, and which he identifies with heredity; and a centrifugal, which results from the tendency of external conditions to modify the organism and effect its adaptation to themselves. No less competent a critic than Huxley takes Haeckel to task for this view. " I think that his method of stating the case has the inconvenience of tending to leave out of sight the important fact—which is a cardinal point in the Darwinian hypothesis—that the tendency to vary, in a given organism, may have nothing to do with the external conditions to which that individual organism is exposed, but may depend wholly upon internal conditions. . . . I conceive that both hereditary transmission and adaptation need to be analysed into their constituent conditions by the further application of the doctrine of the struggle for existence." And in another place he says, speaking of the causes of development, that external conditions " are not themselves actually productive, but are passively permissive —they do not cause variation in any given direction, but they permit and favour a tendency in that direction which already exists."

I have quoted somewhat freely in the last few paragraphs because I was anxious to show that in claiming Darwinism to be on my side when I assert the existence and activity of sub-human will, I am not out of line with modern scientific conclusions. Now that the prin-

ciple of survival of the fittest is applied to the inorganic as well as to the organic, down even to the formation of molecules and atoms, we are reasonably warranted in proportionately extending our views in regard to the presence and activity of will. Not the organic world only, but the totality of things can be conceived as struggling upward in "efforts," not merely to survive, but to evolve something higher. The bird teaching her young to fly can only be fundamentally explained on the analogy of the human mother teaching her child to read. And so likewise the direction of the whole cosmic process can only be fundamentally explained if we read into it the deliverance of our own most intimate experience when we put forth effort to achieve an end.

EFFORT AND MATTER

I have maintained that matter is manifested force, and that force is will; I have also shown that the struggle for existence is the putting forth of effort and is a condition of development. Now it is plain that if there is to be effort there must be resistance to be overcome; and it is also plain that for all forms of existence above the inorganic plane, matter not only supplies the basis, or scaffolding, on which higher modes of existence are constructed, but also supplies a resistant material which calls for constant effort. There are some who go so far as to say that all organic structure, without exception, has arisen by definite efforts to overcome the resistances offered by physical forces, more especially those which assume the forms of matter. We know by experience how that actions, at first executed with difficulty and attentive application, pass into habits and become secondarily automatic, the necessary machinery being called into existence by the efforts made to meet the occasion or to supply the need. From this point of view, the primary automatic actions—the involuntary

beating of the heart, the movements of the intestines, and so forth—are inherited habits. The movements were voluntary at the start, and tissues were gradually built up which, transmitted to succeeding generations, enabled them to be performed without the intervention of conscious will. Our bodies would thus be (as Schopenhauer, indeed, contended) embodiments of acts of will —the putting forth of efforts has produced its own machinery.

Whether this theory be the whole truth or no, at any rate it contains a considerable part of it, and finds its highest illustration in the fact that it is through constant struggle with his environment that man has scaled his heights. Why should we refuse to generalize this experience? We could then view the whole evolutionary process as in part, at least, the result of oppositions established between centres of the will-to-live and forces external to them. Thus inorganic centres become protoplasm; protoplasm becomes nervous tissue; nervous tissue builds up the brain; and brain becomes an organ of the more developed modes of conscious purpose and explicit reason. But more of this when we come to consider the higher facts of experience of which "effort" is undoubtedly a condition.

WILL ONLY ONE FACTOR

If, then, we can accept the doctrine that the driving force of the whole cosmic process is Will, we have made a great stride towards defining our problem of creation. But, as we saw in the case of the player who handles his cue, there is more involved than Will—there is purpose; and purpose implies consciousness and intelligence. Schopenhauer taught that the Ground of Being, Will, is originally blind—a restless, unconscious, heaving, amorphous mode of existence, which in some quite obscure manner willed itself to be a world. But even Schopen-

hauer had to set alongside of his Will, Idea; hence the title of his main work, "The World as Will and Idea." What the relation of the Idea is to the Will is the obscurest part of his philosophy. But this much is plain, that if the universe is dependent on knowing as well as on willing, then consciousness must be present throughout the whole process. Again, on his own premisses, purposive activity implies intelligence. And that he does ascribe purposive activity to his Will is certain; for he describes the power that shapes the chicken in the egg as conducting a process "complicated and designful beyond expression." Now it may be allowable to hold that a purposeless will may be unconscious and unintelligent (though I doubt it); but it is a meaningless combination of words to speak of an "unconscious purpose."

The fact of the matter is that the concept of Will is not full enough to cover all the facts. We have immediate experience of consciousness, of feeling, of personality—nay, of that very longing for salvation which Schopenhauer bids us satisfy by negating our will. If we would keep to the term Will as inclusive of all these modes of experience we must enlarge its meaning, just as the materialist, on the other hand, must on like grounds enlarge his concept of Matter. But thus to forsake the accepted connotation of these terms is to introduce hopeless confusion into our cosmologizing, without securing a shadow of real advantage.

CHAPTER II

NECESSITY, CONTINGENCY, FREEDOM

Necessity, in a general sense, signifies a state or condition that cannot be otherwise than it is. As applied to the happenings in the universe, it assumes the invariable and universal sway of natural law. Given a cause A, the effect B must inevitably follow, at all places and in all times. Necessity, thus viewed, is mechanical—it is, in a double sense, "a dead certainty."

There are many who hold that necessity, thus conceived, pervades every sphere of existence; they apply to phenomena of every kind the category of causality as it has been evolved in physical inquiries; they refuse to admit that there can be any other type than that of the equation of action and reaction in terms of Energy. I trust I have sufficiently shown how insufficient and unwarrantable is such a limitation when we are loyal to the totality of the facts of experience. It is advisable, however, to study it in its relation to the opposing concepts of chance, or contingency, and of Freedom. I shall not go further into these deep subjects than is necessary to define the problem of Creation.

HUME'S POSITION

Let us recall Hume's doctrine that, objectively, we cannot perceive causes of any kind: we can only observe what happens. It is obvious, then, unless we can refute Hume, that to justify the affirmation of necessity in the world external to mind, there must be postulated some unvarying and universal principle of connexion to

govern the various happenings. If we elect to assume such a principle, let it not be forgotten that, from the purely objective point of view, it has no warrant, even though the assumer be the most positive of positivist scientists. It is true that, so far as our observation goes, certain sequences of happenings are invariable, and that on the basis of these we have framed the so-called laws of nature; but these laws are in reality working hypotheses—pragmatic generalizations—liable at any moment to be modified or even overthrown by advances in knowledge. Can we have a more striking instance of this than the assault on the principle which was held to be the main pillar of science, that of the conservation of energy; and especially when we reflect that the assault comes from the camp of those who are themselves physicists! There is thus no bar, should experience of facts demand it, to supposing that the regularities we observe are parts of a system which is the expression of a Will free to work out its own purposes as Dürer was free to express his æsthetic promptings in his pictures. External necessity is transmuted into self-determination.

A passage from Helmholtz is much to the point, and has special significance as coming from a physicist so eminent. "The law of causality is in reality one which we impose by our thought, and is not the result of experience. The number of cases in which we *think* we can trace the causal connexion is very small in comparison with the number of those in which this is impossible. The first belong almost wholly to the inorganic sphere, while the cases not demonstrated belong chiefly to the organic. For animals and men we admit even with certitude, in accordance with our own consciousness, a principle of free will which we are absolutely obliged to withdraw from the dependence on the causal law; and those acts *best known* to us are thus withdrawn."

CHANCE

The idea of chance is, when taken absolutely, the direct contradictory of that of law, and therefore of a necessity inherent in the nature of things. It arose, it would seem, from the popular tendency to infer that an event which has no known cause has not any cause at all. But the demand for causality reasserted itself in the strange form of supposing an agency (Chance) to be the cause of uncaused events!

Laplace, speaking of the movements of the planets, rules out pure chance. "Phenomena," he says, "so extraordinary are not due to irregular causes. In submitting to the calculus their probability, we find that there are more than 200,000,000,000,000 to wager to one against their being the result of hazard—a probability which far exceeds that of the greater part of the historical events of which we have no doubt. We ought then to believe with at least the same confidence that a primitive cause has directed the planetary movements." When Laplace wrote thus, he knew only of some thirty bodies in our system. At what would the probabilities work out now that several hundred are known? Add to this that we have not only to account for the definite configuration, but for the persistency of it; and yet more, for its development in a definite direction; and we cannot wonder that the theory of pure chance has been abandoned. We need not trouble with it further.

PROBABILITY

Let us substitute for the idea of an uncaused event that of an event the causes of which are not known with a sufficient degree of completeness to enable us to trace the uniform sequences concerned. The stock instance is the fall of dice, suggested by the derivation, *cadere*—chance, used with reference to gaming. In every fall,

definite causes are at work; but their combinations are in any particular case unknown to us. We arrange, however, that there are only six possible events for one die. And since we have as far as possible guarded against those causes which would make any one of the six more determined than the others, we know that, for any single throw, there are five faces to compete on equal terms, as it were, with the particular one we may select. It would seem that we have procured the conditions of a case of pure chance. But mathematicians have shown that the happenings are singularly law-abiding, if only sufficiently large numbers be taken to allow the regularities to manifest themselves. The more times the die is thrown, the nearer to unity is the ratio of the falls of any two of the faces. Insurance societies have taken advantage of the practical certainties resulting from statistics which cover large areas of apparently disconnected happenings, and build on them businesses which afford exceptional security and profit to those concerned. We may therefore neglect probabilities, as well as chance, in our attempt to understand the cosmic process: the tentative calculations to which they lead are necessitated by our ignorance, and take more definite shape as our knowledge increases.

CONTINGENCY

What, then, is our outlook? There is no objective reality corresponding to the concept of chance: the concept of probability is of subjective value only. It would seem that we are forced back on inevitable laws of the mechanical type, and that we were too hasty in repudiating its claim to sole sovereignty. It was to meet this difficulty, keenly realized by many defenders of spiritual freedom, that there was evolved the idea of Contingency.

The term itself originated with the Schoolmen, but

the idea is as old as Western philosophy. It has been given many meanings, but has perhaps been most generally used, both in ancient and modern times, to signify an irrational element in the universe, as opposed to physical or logical necessity. If this "irrational" is to be strictly taken, it would imply a lack of a sufficient Ground, and would be in contradiction to the conclusions at which I arrived in dealing with causality. But if it does not mean more than "beyond the limits of human knowledge," it may be usefully retained. If it leads to the recognition of causality other than physical, it expresses an essential truth.

These meanings, however, are all of a negative character. Is there one which suggests positive elements? Yes—for the term came to be used to signify the happenings that depend on the will of a Supreme Being in contrast to those supposed to take place in the logically necessary development of the Idea, or in the absolutely determined Being of the Pantheistic Monists. It thus emphasizes a spontaneous element in the activity of the Ground, of like character to that which falls within the sphere of human experience when the creative impulse is in action. Thus understood, the idea of contingency is of extreme value; for it is only through a belief in spontaneity that we can posit a genuine problem of Creation.

WRECK OF THE *TITANIC*

An illustration may serve to make clearer what is involved in the concepts of Chance, Probability, and Contingency. The *Titanic*, on her first voyage, struck an iceberg, and the loss of life was so unexpected and distressing that it roused many to reflection on the deeper problems of existence. The catastrophe was the outcome of a combination of seemingly disconnected happenings: the freezing of water in the Arctic regions;

the floating off of an iceberg ; the sailing of a ship ; the intersection of the paths of the ship and the berg ; the course decided on by the captain ; and so forth.

Now some of these happenings appear to be pure chance. For example, the launching of the ship and the floating off of the berg would seem to have no connexion with each other. But each has its own chain of causes and effects, and we have only to realize that the universe acts a whole to see that the appearance of chance is delusive. We cannot trace the chains up to their meeting-place ; but our inability does not alter the fact.

Others of these happenings may be looked at from the standpoint of probability. For instance, the captain had to reckon with the probability of encountering icebergs if he steered a northward course. He took into account all the conditions known to him, and concluded the chances were in his favour. But it is clear that, in this particular case, a very slight extension of his data would have reversed his conclusion ; but the principle involved would have been the same had the data been altogether out of reach. The company that insured the ship had to face quite unknown risks ; but, in virtue of the law-abiding nature of chance, were not afraid to take them. For all alike, the probabilities, as such, were dependent, not on facts, but on ignorance of facts.

Others, again, of the happenings were contingencies. For example, the decision of the captain to take a certain course in spite of the danger involved ; the various decisions which led the individuals composing the crew and the company of passengers to sail at that particular time on that particular ship. These decisions are outside the physical sphere and largely depend on spontaneous initiatives due to the working of minds.

The illustration serves, not merely to supply instances of the three sorts of happenings, but affords us, moreover, a glimpse into the meaning of contingency when

applied on the cosmic scale. Consider what an enormous number of processes external to himself were correlated and unified by the decision of the captain of the ship; and how the contingency of his decision was able to insert itself among them—even among those which were physical and mechanical. What do these facts show? That the course of cosmic happenings, including the physical, is patient of contingency, and is elastic enough to admit of being modified by it. How could this be if the various modes of the cosmic process were not in living connexion with each other, and therefore fundamentally akin? And since conscious volition is the highest and most intimate type of activity known to us, we are reasonably warranted in holding that Nature as a whole —natural laws and all—is conditioned through and through by contingency. That is to say, the cosmic process is, to a distinctly known extent, dependent on the initiative and spontaneity of wills which have their Source and Ground in the Supreme Will.

FREEDOM OF THE GROUND

The way is now paved for a consideration of the concept of freedom. I first deal with freedom in its application to the Ground of existence, not with the special problem of free will in human moral agents. I would, as a preliminary, recall Huxley's pronouncement that the struggle for life may lead to a modification in an organism irrespective of its environment. We have here two important implications, the one negative, the other positive. The negative concerns the relation of the organism to its environment: in certain cases there is interaction; but in others, the organism changes without the interposition of stimulus from without: there is absence of external constraint. The positive concerns the inherent powers of the organism, and emphasizes the "freedom" to follow the laws of its own nature.

Now if we apply this to the Ground of existence, it is obvious that the negative condition is absolutely satisfied —there is no environment at all, and therefore there can be no external constraint. We have only to consider, then, the positive condition—freedom to follow the law of its own nature. Its will is free to act in whatever direction, and in whatever mode, may be prompted by its inherent tendencies. Thus the Cosmos is a manifestation of a free impulse to express itself in this form—nothing in it is necessitated, though nothing in it is without its Sufficient Reason in the Ground. There is no such thing as a blind Fate. Nor, when we form our concept of will on our own immediate experience of volition, is there any place for a Monistic determinism ; for we believe that a volition involves spontaneity and power of initiative.

We are thus guarded against two false alternatives. The freedom of the Ground is not the " liberty of indifference " ; nor is it caprice, nor arbitrary fiat—it expresses the inherent nature of the agent. On the other hand, we transcend the conception of physical cause ; machinery can never manifest spontaneity, still less, inherent purpose. We thus avoid the two extremes of an indeterministic chaos of meaningless chance, and a fatalistic Frankenstein monster that grinds heedlessly on its way without origin and without goal. We escape from these nightmares by recognizing that a Self-determining Will underlies all existence ; and in taking this position we are on the firm basis of immediate experience. We know ourselves as capable of definite volition ; and unless we commit ourselves to *ex nihilo*, we are bound to attribute volition to the Being " of Whom, and through Whom, and to Whom are all things."

FREEDOM OF CREATED CENTRES OF WILL

Granting that there is freedom in the activity of the Being Who is the Ground of existence, we pass to ask if

there is freedom, similar in kind, though less in degree, in the centres of the will-to-live which, as we learn by direct experience, exist in innumerable multitudes all around us. The power of self-determination is generally limited, in discussions on free will, to those self-conscious beings who are "moral agents." No doubt the power of moral choice is the highest form of freedom known to us; but it is a grievous mistake to suppose that it is the only form. The quotation from Huxley would alone suffice to correct such a misapprehension of the extent of the issue. An organism, he says, can modify itself from within, apart from stimulus coming from without. The will-to-live manifested in the struggle for life is a fact of experience if there are any such things as facts at all.

I shall show later that Natural Selection produces Nothing—it merely eliminates certain individuals from a total produced by forces of a positive character. Some of these positive forces are found in the action of the environment, and they have received so undue an amount of attention as to induce even Huxley to protest. But the turn of the organism itself has come at last, thanks to the labours of recent students in the field of organic evolution. It is coming to be seen that the organism does not develop mechanically, but that it has a will of its own: it strives to survive and expand; it exerts a directive force from within, and develops by virtue of a conflict with, and a triumph over, the difficulties it encounters.

A striking consequence of fuller knowledge of, and of deeper insight into, vital phenomena is the theory which goes by the name of "organic selection." Its main principle is found in the use of the term "organic" to qualify "selection," not as excluding the more usual term "natural," but as supplementing it. The organism, so to speak, selects itself: that is, it is its own accommodations which are instrumental in securing its survival.

It is *the behaviour of the organism*, therefore, which is important, and not variations alone, as in simple natural selection generally—and hence the adjective "organic." It is in so far the organic functions—reactions, struggles, efforts, conscious choices, etc.—which really count and determine what sort of characters shall be saved by natural selection. Thus the organisms, in a very real sense, may be said to "pilot themselves." I cannot give details concerning this theory; but I would say that it has been accepted by a number of leading biologists and psychologists, and that it is full of hopeful augury for such an expansion of the Darwinism hypothesis as will make it more adequate to the facts of life. It gives definiteness, moreover, to the contention that all life has a self-determining power and gives added force to Spinoza's celebrated axiom that "all life tends to persevere in life."

A self-determining factor, then, is not peculiar to moral agents, but characterizes the whole organic sphere. For myself, I am led to universalize this factor, and see it at work throughout the whole cosmic process, in its entirety and in its parts. My general position would be that of modern Monadologists. I hold that all phenomenal existence is a manifestation of the activities of will-centres which are immersed in a specially conditioned process; and that their interdependent strivings give rise to the endless variety of the relations in which they stand to each other. This extension, however, is not necessary for my argument. Given the existence of self-determination, inherently spontaneous, in any part of the Cosmos, we are compelled, unless we invoke *ex nihilo*, to infer that it exists in the Ground.

MORAL FREEDOM

The presence of spontaneous self-determination is seen in its fullest and most highly developed form in the

experience we have of exercising moral choice. Even those who deny free will have to confess that men do actually claim a power of deciding between right and wrong, and that they have developed a sense of moral responsibility. In our experience, there is an " ought " as well as a must. To urge that this is an illusion is to set a series of fallible reasonings from exceedingly imperfect data over against an immediate deliverance of our self-consciousness. The chances of error in the negative position are assuredly in excess of the chances of self-deception in the positive. At any rate, my case is founded on the facts of experience, not on premisses which are not only abstractions, but are also the outcome of a most partial aspect of a marvellously composite process. Moreover (to repeat an argument previously advanced) if we are determined wholly by forces of the physical type, whence comes the illusion ? To say that a machine generates an illusion that it is not a machine, appears to me to be the veriest trifling.

Into the vexed questions of the sequence between motive and volition, and again between volition and act, there is no need to enter. I am merely contending that consciously purposeful Will is the driving force in moral choice, and that the causality at work transcends the physical type and cannot be brought under concepts of necessity founded on the physical type. The fuller implications of the power of self-determination, and more especially of moral choice, I leave for discussion when I come to deal with personality : the problem which arises from holding that the secondary centres of will are dependent on the Supreme Centre, and are yet in a measure free, is to receive special attention under the head of the Existence of Evil.

SPONTANEITY AND CREATION

Genuine freedom carries with it a power of spontaneous initiative. Not that the initiative is uncaused

—taking cause in its widest connotation—but that it springs from the inherent potentialities of the nature of the agent. We thus arrive at the root principle of what is meant by the term "creation." The nature of the creative act, and its mode of operation, are, indeed, by us unimaginable. But neither can we imagine the *modus operandi* of the simplest causes—the movement of a billiard ball at a stroke from a cue; and much more (if comparisons are here possible) is the "creation" of a work of human art out of our reach. But the facts are in evidence—the billiard ball does somehow move, the picture is painted, the cosmic process goes on its majestic way. The indistinctness of the notion of Becoming does not interfere with our apprehension of the fact.

Theologians have drawn a distinction between the Supreme Creator's activity and that of the creature, and have argued that the act of the created agent reaches only to what are technically called the accidents of bodies. Thus while it is granted that animals and men can alter the face of nature by interfering, within limits, with the natural order, it is denied that they can bring into existence anything really new. I hold, however, that it is a question of degree, not of essential principle. It is true, of course, that a creature cannot create before it is created, and in this sense it is necessarily a secondary agent. But does this debar us from supposing that its nature includes a spark of the Divine spontaneity? Indeed I have maintained (p. 32) that unless we do allow this, we make the Creator directly responsible for the existence of evil—a conclusion specially repugnant. And it is suggestive that, in this regard, even Peter Lombard and Suarez thought that God might use a creature as an instrumental cause of creation. I hold, then, not without high theological authority, that the cosmos contains centres capable of genuine spontaneity.

THE PROBLEM OF THE NEW

But it may be asked, Is not the emerging of anything new into the universe equivalent to creation *ex nihilo*? To argue thus is to forget the concept of potentiality. Even in a purely mechanical universe (*pace* many over-ardent champions of the spiritual) there might arise things that would be genuinely "new" as compared with what had gone before. For atoms might fall into combinations which they had never previously assumed. There can therefore be little difficulty in granting the possibility of the "new" when centres of will assert themselves and interact. But it is plain that, given space and moving atoms, such new collocations of material particles would not involve *ex nihilo*; they would merely represent the realization of hitherto unrealized possibilities. And the case is not altered when we come to the higher activities of spontaneous centres of will—the potentialities they realize pre-existed in their own nature, and, ultimately, in the Being in which they had their Ground and Source. Many possible pictures suggested themselves to the mind of Dürer; and of these he carried into execution the merest fraction. Many possible worlds exist in the mind of the Supreme Being; how many of these He has projected into external being, or will yet project, we do not know; but at any rate we have the world in which our present lot is cast. Our own actual experience, then, enables us to understand how the Supreme Creator may select from among various possibilities in the spontaneous determination to effect a definite purpose. The result will be, not an outcome of physical or logical necessity, but of a definite act of will, spontaneous in its origin and free in its execution.

CHAPTER III

FORM AND LAW

THE Greek word, Cosmos, has become a synonym for the universe—this simple fact speaks volumes. For the original word means "order." According to tradition, it was first applied to the world by Pythagoras, the philosopher who cosmologized on analogies of the numerical relations exhibited by musical intervals; and it is obvious that he must have been deeply impressed by the law and order prevailing in things celestial and terrestrial. The word established itself in philosophical terminology, and is now universally employed when the orderly system of the universe is realized or asserted.

NO CHAOS

The antithesis to cosmos is chaos, a word of mythological origin. It expresses a state of confused disorder, lawlessness, caprice. The increase of knowledge has slowly but surely undermined the original conception, and the idea of a primitive chaos is practically eliminated from philosophy and science. Belief in the universal reign of law has brought us to see that there never could have been a chaos; and has so far cleared the creation problem of what would have been a serious difficulty. Assuming a Creator, we have no longer to suppose that He worked upon a pre-existing chaos which He had to reduce to order.

Whatever theory we may adopt about a beginning, we have learnt that, go back as far as we can, we never discover a state of the universe in which the materials composing it would not have some definite form and

direction. Suppose we start with a diffused cosmic gas, or ether, or other similar mode of Energy, we are compelled to conceive of it as endowed with inherent properties, and with a definite structure; for otherwise we should not have the definite configurations and regular order which we see around us. Or if we confine our attention to the particles of matter, we discover, as we have seen, that form and order are no less in evidence— the electron, the atom, the molecule, the crystal, each has its own structure and its definite behaviour, on the basis of which we can formulate laws and general concepts. We pass up through the chemical order, through the modes of definite combination, into the protoplasmic order, and so up through the plant and animal worlds. Nor is there loss of order when we rise still higher to the spheres of thought and morals. Everywhere reigns definite form and behaviour— nowhere confusion, caprice, or chaos.

An example worthy of special notice is the so-called "periodic law" which is now engaging the practical and theoretical energies of those who are labouring in the higher branches of modern chemistry. The various elements are found to fall into groups so definite that it has been possible to anticipate the discovery of an element in much the same way that the calculations of astronomers have anticipated the discovery of a planet or a sun. And not only can the bare existence of an element be sometimes thus foretold, but even its leading properties. The elements, therefore, differ in determinate ways, and reveal such connexions and relations underlying their differences as allow of their being classified into systems; and the process by which they have come into being may be called, without straining the terms, the genesis, or evolution, of the elements.

The marvellous and exquisite symmetries of the crystal world are but a further advance on the same path

or order and form. Rising above these are the colloids, which, though apparently more amorphous, are in reality more complex. Their subtler properties illude us by reason of their complexity, but are none the less definite ; as is evident when we remember the liquid crystals which connect them with the solid forms of crystal, and the approximately biological phenomena which connect them with protoplasm.

THE CELL

The cell is the unit of organized living structure. It presents a combination of exquisitely adjusted relations which demands the ripest powers of biologists. And after all, how little we have learnt ! The mere enumeration of the terms employed to describe what has been discovered is astonishing—cell-wall, cytoplasm, nucleus, attraction spheres, centrosomes, centrioles, chromosomes, polar bodies, asters, spindles, protoplasmic granules, cell-plate, and a host of others. How marvellous it all is ! Professor Thomson has told us a microscopic cell can be compared to one of our biggest liners crammed with a cargo of the smallest watches. But the structure is only the beginning of the marvels ; for we have to reckon with the vital phenomena—the assimilating of food, the rejection of used-up materials, the continuous renewal of tissues that break down, the maintenance of form and function. Beyond these, again, we have the powers of self-conservation and of reproduction—the latter being accomplished by a series of orderly processes, succeeded by division—where there was but one tiny miracle of structure, there are two, each potentially capable of repeating the division—and so on in perpetuity, so long as the environment allows.

DIRECTIVITY

It is of extreme importance that we should distinguish between mere existence and existence that has definite

form and direction. Cosmology is not, on its physical side, concerned simply with the existence of matter and motion, but with matter manifested in distinctive properties and with motion which takes definite directions; so that there has been built up the Cosmos of our experience. To emphasize a point already dealt with—if we start with the diffused mass of a nebula, it is impossible for us to stop short at the idea of a perfectly homogeneous mass without form or tendencies. Such a nebula could accomplish nothing. Its various parts are arranged in a definite manner, and generally tend to a spiral form; its atoms follow definite paths and condense in systems of definite configuration. Thus it was that our own primitive nebula gave us the sun, the earth, the moon, the rings of Saturn, the swarms of meteorites, and so forth. So too with the atoms that constitute the mass of the Matterhorn—those that developed a Sherwood oak—those that whirl in my brain while I write this. It is in this directivity that we find the real kernel of the cosmological problem. To evade it, and think we shall reach the goal by accumulating descriptions and framing abstractions founded on mechanical physics, is to lose ourselves in issues as far removed from the real as are the diaphanous concepts of extreme Idealism.

HERBERT SPENCER'S FORMULA

Many are scornful of Herbert Spencer's famous evolution formula because of its cumbrous and technical phraseology. I think they are mistaken. The subject-matter is technical, and the long words are helpful as aids to concise expression and clearness of definition. Moreover, it should be accorded a high measure of respect and admiration on the score of being a first and honest attempt to define the most general characteristics of the evolutionary process. It runs thus: "Evolution is an integration of matter and concomitant dissipation

of motion; during which the matter passes from an indefinite incoherent homogeneity to a definite coherent heterogeneity; and during which the retained motion undergoes a parallel transformation."

Now the characteristics here mentioned undoubtedly do present themselves when we generalize and abstract until there is nothing left save the physical concepts of matter and motion. But when all is said that can be said in favour of the formula, where are we? It is a statement which leaves us wondering how far it tells us anything that is worth knowing—especially when we reflect how its author held that the whole process thus described is to be reversed, restored, reversed, in endless cycles of construction and dissolution which seem to be as meaningless as they are hopeless. Of what interest to me, as a living, aspiring being, are homogeneity and heterogeneity, in and for themselves? So far as the formula goes, we have nothing but a blind swaying to and fro of matter and motion. What, then, is the individual value of my life if I simply mark a stage in an aimless process? No—the main defect of this formula is its neglect of the factor of directivity.

The movements of matter are not merely movements; they manifest form and order—this fact must be included in any cosmological formula that claims to be complete, however generalized in its terminology. And the fact remains even on Herbert Spencer's own premisses. For if we restrict ourselves to matter and motion, his homogeneity is not one whit less complex than his heterogeneity: the former could not become the latter unless it were implicit from the first. When the heterogeneous is dissolved, it is merely diffused in terms of space, and remains the heterogeneous still. In other words, form and order are persistent throughout. But if the process is a real development, we can then look for a real advance in heterogeneity, as potentialities are successively deve-

loped; the form and order rise to higher planes. Life becomes worth living because there is genuine directivity in the Cosmos, and the advances made are towards a definite goal.

LAWS OF NATURE

If the Cosmos manifests directivity, what is the place and function of what are called the laws of nature? I have several times stated my view that they are generalized descriptions of certain observed uniformities in nature—that they are gained by confining themselves to some particular aspect of phenomena, to the exclusion of others—and that they are subject to constant modification both in form and in substance. Two things follow. Laws of nature are really expressions of the highest probability to which we can attain; we are therefore warranted in treating them as practical certainties, but not warranted in treating them as absolutes, competent to contradict the clearest deliverances of our immediate experience. And secondly, we must remember that the laws are not something apart from the observed regularities which they summarize, but abstractions founded on such regularities. The happenings in the Cosmos do not obey law, but manifest certain modes of behaviour. The magnet does not attract iron because a law bids it act thus, but because its inherent properties lead to certain behaviour. Therefore if there are degrees of contingency (that is, of spontaneous will) in such behaviour, there will be corresponding degrees of contingency in the laws which formulate the behaviour. It would thus be quite defensible, and much more suggestive, to think of the laws as descriptions of the "habits" of matter.

These physical laws have attracted undue share of attention because they are so fundamental, and therefore so easily apprehended. But they do not stand alone.

Higher in the scale we recognize laws biological, psychological, logical, sociological, moral, spiritual—each and all descriptive of "behaviour," and manifesting clearer signs of contingency as their results are of richer value and dignity. The potentialities are there from the beginning, and all the stages of the process are essentially akin in their ultimate nature. And we are justified in our attempts to find in matter the promise and potentiality of all that is "becoming" as the process moves on its majestic way.

These things being so, it is futile to explain away the significance of "behaviour" in the constituent elements of the Cosmos, or quietly to shelve it by formulating "laws" which merely describe it. The Cosmos is a Cosmos because its nature is to be a Cosmos. And if spirituality is discernible in its highest manifestations, then the Cosmos is spiritual through and through.

UNITY, SUBJECTIVE AND OBJECTIVE

I have contended for the unity of Nature. As concerns the physical universe, at any rate, I have the scientist on my side; it is one of his strong points. But the universe is more than physics, and I have argued for unity in existence as a whole. Nevertheless I have to grant that in claiming this we make an assumption, both because of the incompleteness of the data, and also because, as in the case of causation, we cannot have direct experience of it objectively.

Assuming, however, that the happenings in the universe are all interconnected and form a system, we ask, What is the nature of the bond? If we were to attempt a full answer to this question, we should find ourselves involved in some of the abstrusest problems of controversial metaphysics. But we avoid these by confining ourselves to the direct deliverances of experience. We know, as matter of fact, that hosts of sensations,

emotions, and thoughts can be brought to a centre and interconnected in the system of a single mind. I do not struggle to define the bond, I simply recognize its existence. And starting from my experience of the fact, I look out on the varied happenings in the world external to my mind, and conceive that the bond of their unity may be similar in its essential nature. Indeed, neither scientist nor philosopher has any other analogy on which to frame a speculation ; and without it the concepts and formulæ of science could never come into existence. Our belief in the unity of Nature is the counterpart of our immediate knowledge of the unity of our self-consciousness, and is based on this. Thus interpreted, the states of the universe interpenetrate like the states of consciousness ; and the state of one element in the universe calls for a change in all the rest, as a change in consciousness affects the mind as a whole. The fall of a pin calls for a change in the vast mass of the sun, and so in the vaster mass of the universe. But changes in consciousness are not to be completely explained by physical categories ; neither are the changes in Nature to be completely so explained, if for no other reason than this, that mind intervenes to produce some of the changes and therefore influences all. The surface of the land in England has been changed by generations of purposeful agents ; and the universe is therefore different from what it would have otherwise been : a self-conscious individual centre, then, supplies the key to the unity of the Cosmos.

TRUE SIGNIFICANCE OF LAWS

Although the term " law " may be misused to disguise the inherent potentialities and activities of the elements of the Cosmos, it nevertheless contains a legitimate and inevitable bit of the true anthropomorphism. We ourselves are self-conscious, self-determining individuals

who enter into, and largely define, social relationships of varied kinds. Hence our systems of laws, customs, and conventions, to which we are elastically subject, sometimes *con amore*, sometimes by compulsion. Upon this fact depends the concept of " law " in its many senses, that of " natural " law among the rest.

Now our social institutions, with the regulated behaviour they involve, are expressions of the qualities and properties of human nature. When we look out on the law and order prevailing in the Cosmos, what more natural or reasonable than to read ourselves into these regulated phenomena—this ordered behaviour—these cosmic " habits " ? We instinctively feel that will and intelligence are at work, producing what may be looked on as cosmic institutions. Doubtless we have to be on our guard here ; for the planes of existence are so far removed from ours. Even the animal mind is almost a *terra incognita*, because of the impossibility of directly entering into any experience other than that which is individually our own. Still, we feel there is kinship—fundamental similarity. And this instinctive tendency is indefinitely strengthened when we argue from our immediate experience of will and intelligence in the Cosmos to will and intelligence in its Ground.

CHAPTER IV

THE ARGUMENT FROM DESIGN

In the chapter on the history of the concept of creation, I remarked that the teleological argument, in its old form, can be no longer maintained. Mankind, as a whole, has an undiminished conviction that the Cosmos is permeated with design; but the evidence formerly advanced has been rudely shaken, and the problem has turned out to be much more complex than was imagined. We need not be disturbed by this. Every advance in our knowledge brings with it the task of new and wider co-ordinations. And we could not expect that the great strides recently made in our knowledge of the cosmic process would be easy or speedy of assimilation. It has become an urgent matter to reconcile our conviction of design with the multitude of additional data, and the inferences to which they are leading us.

THE OLD TELEOLOGY

All down the ages men have felt that they saw, in the world around them, adaptations of means to ends such as to argue design, and therefore a Designer. And if what I have advanced in previous chapters has any validity, the inference will be persistent down the ages to come; for it is founded on facts of man's own most intimate experience. The form will vary, the fundamental principle will abide.

The older views on this subject have proved to be inadequate, because they rested on what has proved to be too narrow a basis, and were supported by observations which are now deemed superficial. If the giraffe

can reach up to food which is out of the range of other animals, the older speculators inferred that its neck must have been specially made for the accomplishment of this useful feat. The exquisite contrivances of the human hand, or eye, were thought to be fashioned with direct and immediate reference to the work they have to do. The inference was from the way in which human artificers would use means to ends if they desired to meet the same conditions.

SPECIAL CREATIONS

The most serious error here (quite excusable until recent times) was the idea that each special case had been provided for by a special creation. And the error had a longer life than it deserved because the instances generally taken were those which most readily presented themselves—such as the structure of living creatures; the fitness of certain materials for the maintenance, preservation, and continuance of life; and the like. Man's welfare was particularly to the fore, and all that conduced to advance it seemed to have predominating, if not sole, significance. But when other cases of a more general character came to be studied, many unexpected difficulties presented themselves. The grass may be made for the sheep; but the bewildered mystic, Blake, voiced the perplexities of many when he exclaimed:

Tiger, tiger, burning bright
In the forests of the night,
What immortal hand or eye
Could frame thy fearful symmetry?

. . . .

Did he who made the lamb make thee?

Even had the evolution theory never raised its head, the old argument could not have been generalized. It became less and less convincing in proportion as the

cases for which it could not account increased in number and urgency.

Another serious objection to this argument is this : it is peculiarly open to a charge of *petitio principii*. Consider the implications of Paley's argument, that because human design made the watch, therefore superhuman design made the eye. (The more valid form of this argument I attempted to formulate in an earlier chapter.) Now if this is to be logically sound, it must depend on a universal proposition that wherever we find adaptation we must infer direct purposeful design. But this is the very point to be proved ! Have we the right to take it for granted that there cannot be adaptation without design ? We know that many subject this premiss to searching criticism, and that many others reject it—it cannot, then, be self-evident ; we must go deeper. And further, as Lotze has suggested, to hold that there cannot be harmonious adjustment without conscious purpose is to adopt a belief that the irrational and chaotic has a better right to exist than the rational and orderly—a belief which he condemns as strange and unaccountable. We must go deeper, I repeat, if we would save the principle for which Paley, with the inadequate data at his command, so acutely and so stoutly contended.

I have in various contexts maintained that the true basis of the argument must be found in our immediate consciousness of purposeful design. We are compelled by *ex nihilo nihil* to credit this to the Ground of our being. The argument, thus expanded and deepened, must be shown to apply, not only to particular instances of apparent design in nature, but to the cosmic process as a whole. In proportion as we succeed in this, in that proportion will the inference from analogy gain in probability and cogency. The grand harmonies of nature, celestial and terrestrial, come into view, and the charge of *petitio principii* fades into insignificance.

EVOLUTION AND DESIGN

If we ask what was the general tendency of speculative science up to the coming of Darwinism, it may be held to have been, on the whole, in favour of the argument from design. For though it was constantly creating fresh problems, it also stimulated larger views, and set particular cases of adaptation in truer perspective. The exquisite adaptations of hand and eye did not lose their evidential value, but were studied with a fuller perception of the law and order pervading the universe as a whole. The great lack, however, was the want of some co-ordinating principle which could take the place of the old idea of separate creations supposed to have happened at some definite point in past time. There were gropings after such a principle, but there was no genuine grasp of the idea of a cosmic process, by which things gradually become what they are, and by the continued advance of which things are destined to yet further changes.

With the coming of Darwinism, when the first revolutionary shock had passed, we began to learn that we are living, not in a static, but in a dynamic Cosmos, and there has become possible to us the view that the world was not ready made; that it has been always, and still is, "a world in the making"—a development which does not depend on special interventions to meet special needs, but which is a slow working out, by continuous stages, of one all-embracing purpose.

Of course we could not expect that a hypothesis so revolutionary would not bring with it cosmological problems of proportionate gravity and magnitude. We are adjusting ourselves, however, with what is really a remarkable rapidity when we consider the enormous momentum of tradition and the tyranny of long-established custom. And we are already realizing that so far from invalidating the argument from design, the

new knowledge is giving it a firmer basis, and at the same time ennobling it. Let Huxley speak: "There is a wider teleology which is not touched by the doctrine of evolution, but is actually based upon the fundamental proposition of evolution."

NATURAL SELECTION

One of the most formidable difficulties raised by Darwinism, as against belief in teleology, is that which arises from the theory of Natural Selection. The ground is familiar, and I assume general knowledge of its main features. The theory rests on three main principles—the multiplication of organisms in geometrical progression, and the consequent struggle for life: the occurrence of individual variations; and hereditary transmission of variations. In the struggle, the "fittest" survive; out of indefinite variations, certain are selected which are best suited to their environment. The great naturalist supposed that this "selection" was sufficient to account for the origin of all the organisms that people our globe. But subsequent criticism and research have shown that Selection must be supplemented by other factors. Not only is the Lamarckian hypothesis of the inheritance of acquired characters alive and thriving, but Mendelism, and other weighty speculations, are proving that Darwin, in his turn (like the old arguers from design) had not grasped the complexity of the problem. His views are being continuously modified and supplemented. But despite the necessity for reconstructions and extensions, the main principle for which he contended has firmly established itself, not only in the sphere of biology, but in physics, sociology, morals, theology—indeed in practically every branch of human research which deals with the phenomena of Becoming. Our present concern is with its bearing on the argument from design.

INDETERMINATE VARIATIONS

Let us begin by supposing that the variations which afford the material for selection are really indeterminate —fortuitous—that they occur by chance, and in any and every direction promiscuously. It would seem that, stated in this extreme form, the doctrine makes design a useless laggard on the stage. The human eye, for instance, would thus be simply, *de facto*, the resultant of a countless series of variations which have been selected out of a vastly greater number on the sole score that they were fitted for the environment. We thus trace its development from a spot of pigment sensitive to light up through various stages to its existing form; it survives because it is the most useful of a host of other eyes that were its rivals, because it avails most in the struggle for life. It was not designed, but came into being by a purely "natural" process—in sharp contrast with that which results in the production of a watch. In the making of a machine by human agency there is determinate selection of means to ends—in the production of the eye there is only survival of certain advantageous, but fortuitous, differences in a long succession of organisms.

NO CHANCE

Such a conclusion, I say, would seem to be fatal to the argument from design. But first impressions are apt to be deceptive. In the first place there occurs to us our decision in the section on Chance, that there cannot be anything that is really fortuitous. Observed regularity of sequence we know: contingency we know: spontaneity as self-determination we know: but Chance is a goddess painted on the dissolving clouds of ignorance. There is no Becoming for which there is not a definite cause.

Again, we saw that chance, in the more developed form of probability, is one of the most law-abiding things in the world. And just as an insurance company can build up a stable business out of seemingly fortuitous happenings, so a Supreme Designer could build up a stable and purposive universe on a basis of what we might, from this point of view, call " fortuitous " variations. The indeterminateness of the data does not prevent the insurance society from adapting means to ends, or from manifesting design in its proceedings and its constitution. The indeterminateness, therefore, is evidently in some sense determined. Shall it not much more be so when we consider the cosmos as a whole ? At any rate we are justified thus far, at least, that we can deny there is any contradiction between the indeterminateness of our actual experience and the presence of design. Even on these extreme views of Selection, therefore, we can approach the problem of design without preconceived prejudice.

But our brief study of directivity has shown us that Selection cannot possibly be indeterminate. The atoms themselves have definite forms and affinities, combine in certain calculable proportions, and others rule out all variations which contradict their " behaviour." More than this, they favour certain combinations more than others, and so still further restrict the number of possible variations. And what is true of them is still more true of their higher combinations—molecules, crystals, colloids, protoplasm, and the rest. No, we cannot find indeterminism, in the sense of fortuity, anywhere in the universe. Variations, like all else, have definite causes behind them. We cannot wonder that biologists are beginning to detect certain significant trends in organic development : and observations of this character will doubtless multiply as knowledge becomes more detailed and co-ordinated. Even were it not so, the argument

from design persists, and, with the growing recognition of directivity, gains in power of appeal as the years pass by.

SELECTION NOT A POSITIVE FACTOR

Let us now turn to analyse a little more closely the factor of Selection as conceived by evolutionists. Given a succession of organisms multiplying at a rate which renders it impossible for them all to survive, it is obviously advisable that the survivors should be superior, in some sense, to those that perish. Now Natural Selection secures this result in a way as simple as it is effectual—the "unfit" go to the wall. It follows that this factor is equal to explaining in some degree the fact that there are many actual adaptations to environment. But two restrictions at once suggest themselves when an attempt is made to use Selection as an argument against design. First, we ask, What is it that selects? Secondly, we realize that the factor has no positive function—it merely eliminates material provided for it by other factors.

First, we ask, What selects? If we say it is the environment, we are then back at our original problem, for the environment is the Cosmos. We cannot argue that the Cosmos does not contain design because it selects—the argument is rather quite the other way. Indeed, when we discover directivity in the Cosmos, Selection at once takes its place as one of the modes in which this directivity manifests itself. Things are what they are because they have been selected for realization out of an indefinite host of possibilities. The way is clear to postulate a Supreme Designer.

Secondly, important as is this factor of Selection, it produces nothing—it can only destroy—it is simply negative in its function. We may compare it to a man with a club, standing behind a door, and killing a certain

number of those who pass through. He does not supply his own victims; he is an executioner. How utterly guileless it would be for the survivors to thank him for being the author of their being! And yet those who maintain the all-sufficiency of Natural Selection betray a guilelessness no less absurd when they credit this factor with the origin of species, and with the course of evolution! A prior and a far more fundamental problem is, Whence the variations from which selection is made?

DETERMINATE TREND OF THE PROCESS

We are thus brought back to the conclusion already reached, that there is some directive agency at work which sets going and maintains a process in which, out of various potentialities, certain are actualized because they tend to the attainment of a goal. The failures may be attributed to the element of spontaneity. Palæontologists have been impressed by the character of certain types they have noticed, because of the definiteness of their succession. These organisms, they tell us, have entered on a clearly marked line of development, follow it with an unmistakable directness that suggests an aim or goal; and what is yet more significant, many kindred groups follow the same line. There is good reason for universalizing these deductions. For is it not reasonable, if we discover "aim or goal" in some of the parts, to infer that purpose had a place in the creative activity from which the whole proceeds?

CHAPTER V
LIFE

SCIENCE is limited to description—it cannot account for the things it describes, either in regard to their origin or their meaning. It is more particularly at home in the description of masses in motion. And we have seen how that, because of the comparative simplicity of physical concepts, and because of the wide range of their application, many have been tempted to think that these concepts would explain everything.

LIFE AND MECHANISM

The early materialists tried to keep to purely physical concepts dealing with matter in motion. When these confident thinkers were confronted by the phenomena of life, they boldly continued to maintain the sufficiency of their mechanical theory. Certain Cartesians were consistent enough to assert that animals are automata ; they did not even credit them with feeling, and would kick their dogs to set the howling machinery going. They were not consistent enough, however, to apply this method of experiment to each other ! A later materialist, while not denying feeling (as he surely in consistency should do) gives to a book of his the title, " Man a Machine." Du Bois Raymond went to the heart of the matter when he said that if the mechanical theory be right, then there will be no essential difference between describing the trajectory of a cannon-ball on the one hand, and describing a leaf, or a beetle (I would add a Raphael or a Beethoven) on the other.

Later materialists have tried to supplement the painful

deficiencies of pure mechanism by recognizing chemical forces. But this device cannot avail until we know what they deem those forces to imply. If the new factor is simply an extension of mechanism, we have not advanced a step beyond the fundamental concept of mechanical working; if it is to cover the causes of distinctively vital phenomena, then there remains, unsolved as ever, the problem of the nature of these phenomena.

It is true, of course, that an organism may be regarded as so much matter in motion, and be studied like the motions of cannon-ball or star: true also that even the mind has its physical conditions. But when we ask what is the difference between a living and a dead organism; or that between the turning of an engine crank and assent to the proof of the forty-seventh proposition of Euclid: then mechanism and chemistry are helpless. The various levers of the human body, the circulation of the blood, furnish clear and admirable instances of mechanical action. I go further, and deprecate attempts to limit physicists and chemists in their researches into the mechanical aspects of life and mind. But we must protest when biologists would have us rely on physical data for full explanation of phenomena which are superphysical.

CHEMICAL ACTION AND LIFE

There are now few who think that pure mechanics can explain everything. Indeed the New Physics itself passes out of the familiar categories of mechanics—much more of biology. Certain biologists invoke the aid of chemical action. Chemistry is increasingly held to be a branch of the science of electrons and electricity; but it takes us into the sphere of obscure phenomena of which little is yet known. It is admitted by those who grapple with these phenomena that "deep-going changes take place at the entry of substances into chemical com-

bination by reason of which the relation of a compound to those of its constituent parts can never be quite perspicuous." We exchange the clear-cut definitions of mathematical physics (the most abstract and therefore the most inadequate of all formulæ) for relations which " can never be quite perspicuous " ! If no one knows what they are, it is safe to refer all awkward phenomena to them !

The tactics are good—but are they satisfactory ? They are assuredly not scientific. Again I ask, Have we, or have we not, passed beyond the mechanical categories ? I myself am prepared to see in matter the potentialities of mind. But that is because, as I have shown, I conceive matter to be mind from the very start. I hold matter to be Energy, and Energy to be Will. Unless we endow matter with psychical properties, we can never evolve mind from it without a vastly worse *petitio principii* than that involved in the older form of the argument from design.

From the strictly logical point of view, it may be urged that science has never yet thoroughly analysed protoplasm, nor succeeded in actually building it up ; and that it is therefore an illegitimate assumption to suppose that it can be what it is without the addition of some life-force coming from outside the materials that compose it. Logically, the objection is sound. But practically viewed, I regard it as unconvincing and dangerous. For I anticipate that the gap between so-called dead matter and living matter, already rapidly filling up, may sometime altogether disappear. Why struggle to prove this gap ? We may, indeed, have open minds on the subject ; but to think that a gap, as such, is going to save the doctrine of the spirituality of the universe appears to me to be a disastrous error. For if the doctrine is valid, it must apply throughout—matter, too, must be shown to be spiritual.

LIVING MACHINES

Let us come to closer quarters with the problem of Life. Organisms manifest mechanical movements and chemical reactions: in certain cases there are also emanations of light and electricity. But there is much more than these—nay, these are quite subsidiary to the higher and more complex functions of living organisms. A plant or an animal does not depend wholly on external impulses for its movements: it regulates to a very considerable extent its own course so long as the environment will allow. It seeks for food, and thus provides itself with the energy required for the work it has to do; and within certain limits it can repair its own defects. As has been well remarked, in a machine the mind that makes it and works it is outside the machine, and is independent; whereas in an organism the mind is inside and is, in its vital activities, identical with its structure. In brief, an organism works for itself: it has its own wants, which it seeks to satisfy by its own efforts. It is a centre of the will-to-live.

In the now almost classical work of Jennings on "Behaviour in the Lower Organisms," the author asks whether their behaviour is such as to lead us to infer the presence of consciousness; and while acknowledging that his answer is not capable of demonstration, he expresses his own views thus: "The writer is thoroughly convinced, after long study of this organism [the amœba] that if it were a large animal, so as to come within the everyday experience of human beings, its behaviour would at once call forth the attribution to it of states of pleasure and pain, of hunger, desire, and the like, on precisely the same basis as we attribute those things to the dog. This natural recognition is exactly what Münsterberg (1900) has emphasized as the test of a subject. In conducting objective investigations we

train ourselves to suppress this impression, but thorough investigation tends to restore it stronger than at first." *

LE DANTEC

This quotation from Jennings forms a useful contrast to the conclusions of a French biologist, Le Dantec, who is animated by an almost fierce determination to see nothing more in animal behaviour than mechanics and chemistry. One of his treatises, containing a lively and exceedingly suggestive statement of his main tenets, concludes thus: "In that which strikes our senses in our observations of living beings, there is nothing outside of the natural laws established for brute matter (chemistry and physics); this is what I have wished to establish in the course of my study of the phenomena of life."

The phrase, "This is what I have wished to establish," is highly characteristic, and compares badly with the modest and cautious language of Jennings. The latter, moreover, was dealing only with one of the lowest of organisms—the amœba; Le Dantec is much more wholesale: he speaks of "living beings" generally, and of "the phenomena of life." In reading this and other treatises by the same author, I have often been led to wonder whether he includes himself! If he demands actual demonstration of the presence of consciousness in organisms, he is at liberty to do so. But has he reflected that he cannot demonstrate the consciousness of his readers? None of us can know with irrefutable certainty that any living being, save himself, is conscious—Solipism is not to be controverted on strictly logical grounds, though we repudiate it on pragmatic grounds. And Le Dantec is not even in a position to demonstrate the existence of his own consciousness—he only knows it by an immediate deliverance of the consciousness itself. Hence the force of the conclusion arrived at by Jennings

* "Behaviour of the Lower Organisms," p. 336.

—" In conducting objective investigations we train ourselves to suppress this impression [of the presence of consciousness], but thorough investigation tends to restore it stronger than at first."

The penultimate paragraph of the Le Dantec treatise from which I quoted above runs thus: "It is often objected that there may be other facts which our senses cannot reveal to us. . . . We cannot establish laws for anything other than that which strikes our senses—that is, for phenomena; moreover we ought not to speak of anything else than that which we can observe; the natural sciences are sciences of observation." But can we observe consciousness?—or Cause?—or the links in Le Dantec's argument? I agree with him that such things are out of the range of physical science; but is this to say we ought not to speak of them, or recognize their existence? His argument simply comes to this—I cannot see consciousness; therefore I refuse to recognize it. It is thus more than a *tu quoque* to say—I cannot see the force of Le Dantec's argument, and therefore I cannot accept it.

LIVING BEINGS STRIVE

Le Dantec uses the phrase, " we ought not to speak." Taking his point of view, I am to regard him simply as a machine to be explained wholly by physical laws of thought. What, then, does he mean by " ought "? Neither he, nor any one else, can do anything which does not result from physics and chemistry—we turn out our words as a Babbage's calculating machine turns out figures. The " ought " is meaningless—and yet Le Dantec evidently intends us to feel we are labouring under a mistake in not agreeing with him. That is to say, Le Dantec's machinery has so totally failed to describe the observed phenomena that he uses a term implying the existence of something that does not exist,

and expects other machines to realize their obligation to bring this non-existent into existence. Either, then, physics and chemistry cannot explain all the observed phenomena, or we are in a topsy-turvydom which baffles description.

One of the most certain of the phenomena exhibited by Le Dantec's treatise is this—there is a living being who wants to convert us to his views—a living being who has a purpose. Granted this aim, we can understand his " ought." I am not prematurely introducing questions about free will or moral choice—I am simply taking the observed facts; and I conclude that they mean more than physics and chemistry.

If we like to dichotomize, and to divide all phenomena into physical and non-physical, we are at liberty to do so; though dichotomy is nearly always a barren procedure—especially as Nature knows no finely cut logical lines of division. But if we do so divide phenomena, we must not quietly submit to the substitution of " chemical " for " non-physical." If consciousness, will, reason, love, are facts of experience, let them be fairly acknowledged in their own right, and find due place among the " observed phenomena." Fortunately, in spite of the dogmatisms of Le Dantec and his school, there are signs of a more healthy speculation on cosmic problems, the problem of Life among the rest. Hitherto it has been too generally an aim of scientists to stretch all phenomena on the Procrustean bed of physics. But we are living in days when many men of foremost rank are feeling after a wider range of biological principles. There are even attempts to find in atoms and molecules —brute matter!—an inner principle of adaptation. There is, for example, the vague and tentative tracing of the phenomena of " fatigue " in metals; the term " fatigue " is no doubt largely a picturesque metaphor, but it is suggestive and may lead to further linkages between the phenomena concerned.

MODERN ANIMISM

From the side of philosophy, the idea is gaining force that the whole of reality is psychical. Fechner, for instance, so sympathetically championed by William James, was one of the earliest and most thoroughgoing of modern animists; and his attitude is the more noteworthy in that he was by training and profession a physicist rather than a metaphysician. Here is James's masterly summary of his doctrine: "The original sin, according to Fechner, of both our popular and our scientific thinking, is our inveterate habit of regarding the spiritual, not as the rule, but as an exception in the midst of nature: instead of believing our life to be fed at the breasts of the greater life, our individuality to be sustained by the greater individuality, which must necessarily have more consciousness and more independence than all that it brings forth, we habitually treat whatever lies outside of our life as so much slag and ashes of life only; or if we believe in a Divine Spirit, we fancy him on one side as bodiless and nature as soulless on the other: What comfort or peace, Fechner asks, can come from such a doctrine? The flowers wither at its breath, the stars turn into stone; our own body grows unworthy of our spirit and sinks into a tenement for carnal senses only. The book of nature turns into a volume on mechanics, in which whatever has life is treated as a sort of anomaly; a great chasm of separation yawns between us and all that is higher than ourselves, and God becomes a nest of abstractions." *

From another side, the psychologist Stout, after showing that the extension, configuration, and other qualities of material bodies all presuppose the existence of certain modes of conscious experience, and that the ultimate constituents of matter, as they are recognized

* "Pluralistic Universe," p. 150.

by scientific theories, are abstract constructions of the human mind, concludes thus : " One thing seems clear—that we are nearer the truth in speaking of it [the material system] as consciousness than in speaking of it as matter."*

Similar quotations from leading thinkers might be multiplied indefinitely. We may well take heart of grace that a new and more fruitful era of speculation is dawning It cannot be too frequently insisted upon that life is greater than science, greater even than thought. Physics and chemistry have won an honoured place in the circle of the sciences. But as the sole means for explaining the phenomena manifested by living organisms, they are bloodless abstractions which can only give us soulless machines in a dead world.

EVERYTHING LIVES

There are some biologists who postulate the action of a special life force which uses materials and mechanisms for its own ends—with this doctrine I shall deal directly. For myself, I have concluded that such a dualism is unnecessary. I hold that there is continuity in the transition from the chemical to the biological, as there is from the mechanical to the chemical. I regard these as more or less definitely marked stages in a process which is actualizing the potentialities inherent in the totality of things. The advance is mainly effected by bringing the various parts of the universe into new relations. In music, the key-note, its third, and its fifth have each a separate existence of their own ; sound them together and we have not another note, but, as Browning says, " a star "—harmony comes into being. In the same way, bring human souls together in new relations, and there are begotten new institutions ; these beget new physical, mental, and spiritual qualities ; these in turn

* " Manual of Psychology," p. 54.

beget new institutions ; and so on until the potentialities of man's nature stand revealed in all their endless richness and variety. I apply this principle to the development of the Cosmos. Everything is living. And since life can only come from life, the Source and Ground of the Cosmos is Life, manifesting Itself in will and purpose, everywhere and always active.

CHAPTER VI

VITALISM AND DIRECTIVITY

We saw that Darwinism was content to start with variations, which it called " fortuitous," and to leave the rest to Natural Selection. We considered some of the criticisms which have to be passed on this theory: let us proceed to notice another serious objection to which it lies open.

The variations out of which selection is made are, according to Darwinians, exceedingly minute and also promiscuous. How could they, then, be of such distinct service as to have survival value ?—and how could they be co-ordinated ? It is only fair to Darwin to remember that, although he laid very great emphasis on the non-purposive factor in evolution, he nevertheless maintained that Natural Selection, without teleological factors, could not account for all the facts. Many of his followers have not been so cautious, and for these the difficulty is formidable, and, as I think, insurmountable.

THE MUTATION THEORY

This objection to strict Darwinism is to some extent met by the recent theory of mutations. Certain naturalists claim to have discovered that variation may not always proceed by stages so small that they could not be of immediate use, but that there occur from time to time sudden single variations of comparatively great magnitude; that those which have survival value are seized upon and transmitted. A new species would thus come into existence, not only by the accumulation of imperceptible variations, but by a series of perceptible

developments. The general conception would be that of a flight of steps as opposed to an ascending plane.

This new theory is still the subject of keen controversy, but is gaining in authority; and it certainly removes a serious obstacle to the older forms of the evolution hypothesis. Still, I cannot bring myself to accept any doctrine which involves a distinct breach of continuity. Is it possible to reconcile the two conflicting views thus? Let us give up the idea of "fortuitous" variations, and let them be determinate. Then we can imagine that within the organism there are constant changes going on which in certain cases accumulate without producing a marked difference in structure, but which at last attain such force as to upset certain pre-existing structures, and make themselves perceptible in some definite resultant. A rifle-bullet shows a sudden change when the powder explodes; but how many subsidiary causes had been at work before the explosion could take that form? But whatever may be the merits of the mutation theory, the main principle of development by selection is intact. And the real problem is, as I remarked in an earlier chapter, to account for the variations from among which the selection is made.

VITALISM

One explanation of the cause of vital phenomena and of organic development comes from the school of biologists known as Vitalists. They postulate a life-force which has a share in moulding the organism. If this life-force is supposed to be of a nondescript character, we are still in the sphere of fortuity—though even so we mark a stage onward, inasmuch as we are free from dead mechanism as the sole agency at work. But the more definitely this life-force is conceived, the more are we led to recognize directivity.

The vitalistic theory is as old as Aristotle, and from

his days downwards until well on in the last century it formed the working creed of all physiologists. Haeckel praised Müller for being the first to break away from it and to search for a mechanical explanation of life and mind similar to that which was thought to explain the working of the muscles and digestive organs. It was not long before vitalism was looked on as once and for ever vanquished and discredited. Hardly had the pæan of victory died away when the slain raised its head and fought more valiantly than ever, in complete modern panoply.

It must not be thought that the reaction is to be attributed to philosophic or religious protests: its doughtiest supporters are found in the ranks of trained biologists, and it enjoys the patronage of leaders of all schools, scientific, agnostic, positivist, as well as idealistic and theological. In short, it is not too much to say that, in its most general form, the conception of some impulse in Nature, over and above mechanism, is a rallying-point for much of recent speculation.

Needless to say, I heartily welcome this reaction. My chief divergence from it comes from its implicit dualism. I cannot bring myself to think that matter is dead, and is used as material by an alien vital force. I believe that matter itself is living, and that the distinctively vital phenomena are evolved in due course from its inherent potentialities. I make this preliminary observation in order that what follows may fall into its place in my general line of argument. But I would further remark that, whether on the Vitalist's view or mine, the inference from the facts to the Ground remains firm. Given Life, we are bound to attribute it to the Being from Which it proceeds.

LANGE

Naturally the vitalistic conception takes many forms. The transition from mechanism may be seen in Lange,

who, while anxious to keep as close as possible to mechanical categories, suggests that the atoms have determinate shapes, and therefore favour certain definite combinations. He adduces, as being of exceptional import, the law of substitution in carbon compounds. For him, the constitution of the atoms gives the possible forms, and Natural Selection gives the actual forms. This theory opens the way to the recognition of some directive agency, and so to Vitalism ; but it is still more strongly in favour of the view which I espouse. It helps us to understand the crystal, and much that is above the crystal ; to deny that the variations are fortuitous ; to trace direction in the stages of the evolutionary process, on the small scale and on the large. And what is yet more helpful, it gives us a glimpse of the unity of plan and method that underlies the Becomings of the Cosmos.

COPE

The American biologist, Cope, is one of those who take a much more definite stand for Vitalism, in that he insists on fundamental laws of growth. He unites Darwin and Lamarck in about equal proportions—that is to say, he strives to utilize both the principle of Natural Selection and that of the inheritance of the effects of use and effort. But he adds to the principle of these two great leaders that of a special developmental growth-force. He conceives this to act by accelerating or retarding the processes which are called mechanical. An organism, he contends, has within itself a tendency to determine its own development ; and he supports his view by a wealth of detail into which we cannot here enter. We may sum up his teaching by saying that he thinks an organism can act independently of Natural Selection, and that it is to a considerable extent the controller of its own " fitness."

We have already seen something like this in consider-

ing the theory of Organic Selection ; and we are reminded of Huxley's clear pronouncement as against Haeckel. I have little to say in criticism of Cope's position, save that, from my point of view, he tends to separate the life-force from the material organism ; whereas I conceive that the life-force is inherent in the organism—indeed that they are identical. The organism is itself an individualized manifestation of the will-to-live. The remarkable evidence Cope produces for a directive agency is all to the good in the argument against mechanism, and must be welcomed by all who seek scientific support for a philosophical conviction of the presence of design.

DRIESCH

The most authoritative, perhaps, of modern Vitalists is Driesch. He delivered two remarkable series of Gifford Lectures, the main object of which was to establish what he terms " the autonomy of life." He would revive in an amended form Aristotle's doctrine of " entelechy," as, in his opinion, best satisfying the requirements of the problem of organic functions ; he leaves aside most of the connotation which the concept originally had, but retains the part conveyed by the etymology—something that bears its end in itself. Anxious to avoid needless controversy, he is willing to substitute, for " entelechy," a bare x—so long as he can conserve his essential point that there is in each living organism a source of activity over and above mechanism. He maintains that this activity is independent : not in the sense of giving laws to itself, but in the sense of being subjected to laws which are peculiar to the phenomena of life. He is confident that such an entelechy (or x) is necessary to account for the facts, though he does not dogmatize about its nature or origin. Here we have modern Vitalism at its best. Were I driven to

distinguish sharply between mechanism and life, this is the doctrine I should adopt. And, indeed, when I come to deal with the creation of individual centres of the will-to-live, my conclusions will be very similar on the side of the entelechy; but I prefer to think that the appearance of each such centre brings with it a set of relations which constitute the environment, inclusive of the material conditions. Instead of mechanism, I suppose interactions of individual centres of will.

BERGSON

The philosophy which is the most symptomatic of the trend of modern thought is that of Bergson, whose speculations are based on the conception of Life as an original impulse, spontaneously and inherently creative. Among other analogies and metaphors, he pictures Life as a current flowing on from generation to generation, and intensifying as it advances. He holds that from the very first it had within it a tremendous force, destined to carry it on to its highest manifestations. In the stages of evolution we trace its progress, and observe how the stream has divided and diverged in various channels, without ever ceasing to retain its essential nature. Hence the title of Bergson's chief work, "Creative Evolution." He has pulverized, one would hope finally, into still smaller fragments the wreckage of the older Materialism, and has shown, with abundance of vivid illustration, that Life is something quite out of reach of physical categories and abstract concepts of any kind—it is something which is lived, and can only be known by the living of it.

Richly suggestive and thoroughly wholesome for these days as is the doctrine thus briefly outlined, it is not yet sufficiently thought out to serve as a cosmology. Bergson has stopped short at the generalized conception of Life, but has not essayed to probe the problems of

purpose and of individuality. Let us be grateful for what he has already produced, and trust that he may supplement his speculations sufficiently to give us a fairly complete exposition of his views on these deeper questions. It is much to have shown that Life is creative—it will be more to show that it is purposive, and that it has a goal.

PLANT LIFE

Having passed in quick review the teachings of certain eminent Vitalists, let us consider some of the salient facts for which they tried to account. Bergson believes progress to come from the dividing and diverting of the stream of Life. His first great division is into the plant and animal kingdoms. He distinguishes each chiefly by its tendencies rather than its positive characteristics—the one tending to immobility and unconsciousness, the other to mobility and consciousness. I confine myself to the plant world, and at once confess that I am not very comfortable in this generalization ; for some of the higher forms of plant life come very near to mobility and consciousness—as, for instance, the Sensitive Plant, the Sundews, and the Venus Fly-trap. It would seem that here, as everywhere else, the curve is upward though the direction taken may be genetically characteristic. And this idea is strengthened when we realize how wonderful, in the plant world, is the adaptation of means to ends. A botanist of repute says that " the apparatus by which the Bee-orchis or the Garden Sage secures the aid of insects for fertilization, or that by which the Cranesbill or the Thistle scatters its seeds, excel in ingenuity the snares of the spider or the ant-lion. They are comparable indeed with well-known devices like the sling or the parachute. And let it be noted that such devices are the rule and not the exception in plants."

The presence of directivity and of purposive function is almost forced upon us. So long as the tissues of a typical plant are in healthy activity, there is a constant succession of impulses which mould the leaf, the branch, the flower, the fruit—a continuous ascent through orderly changes to the perfection of the species. But more than this, we infer from the facts that the seed was for the branches and the leaves, the branches and the leaves for the blossom and the fruit, and the fruit for the seed. Each stage in the cycle has its definite place in the succession of means to ends. The earlier growth and development were with a view (unconscious, if you like) to the seed, and thereby to reproduction. There is unity of aim as well as Bergson's spontaneous creative activity. The later stages of the development are dependent on the earlier—and this means much; but the later stages spring out of and reach the goal of the earlier—and this means much more. In the absence of the strongest rebutting evidence, we are led to conclude that the whole process is under the guidance of a directive will. And thus Schopenhauer is not straining a point when he compares the relation between the earlier stages and the last with that between writing and printing. For the impulse that leads to the serial development is in each case fundamentally the same, whatever differences there may be in the measure of accompanying consciousness.

IMPERFECTIONS AND WASTE

The doctrine of directivity has to grapple with certain familiar difficulties which are rightly raised, but which often are given quite disproportionate weight. Fortunately the coming of Darwinism has not increased, but lightened them. So long as men believed in immediate and special creations, any imperfections which could be pointed out were decidedly awkward. The

critical physiologists had a rather strong case. They could show that few, if any, organs are perfect relatively to the functions they have to perform; that even the delicately correlated mechanisms of the human eye are open to serious criticism: that there are many instances of organs which are rudimentary, and of organs, no longer needed in a changed environment, which drag on a dwindling and seemingly useless existence. More puzzling still was the apparent wastefulness of Nature—the superabundant production of seed or offspring, the fruitless perishing of vital germs, the abortion of processes which never reach their goal.

The special creationist, I say, was hard beset when asked to explain these apparent anomalies, though he was by no means overwhelmed. He would urge, for example, that our knowledge is so limited we cannot see the ultimate results of a prolific generation of certain germs; that even in our own sphere of observation there are special cases to be met, such as drought, flood, and the like. Then there is the food aspect of the problem—for seeds and fruits have other purposes to serve than reproduction. Or he might take more general ground and argue that Nature must be taken as a whole, and that what may appear to be waste in the parts is conserved in the total. Or, again, that Nature is not solely concerned with reproduction, but manifests a non-utilitarian spontaneity of which the superabundance of life-germs is one form out of many.

Such considerations doubtless have their place and an appreciable measure of force. But when we analyse them, they are seen to be merely palliatives—they do not satisfy—we are still perturbed. But when we set these difficulties in the light of the evolution theory, we experience a sense of relief; for we realize that, instead of being an objection to the argument from design, they are in line with it. If there is to be continuous progress,

there must be transition from stage to stage. If an organ is needed, it must be developed : if it is no longer needed, it must slowly disappear. Hence rudimentary and dwindling organs ; hence, also, imperfections, because slowly acquired adaptation can seldom be perfectly adapted to conditions which so constantly change. Again, in respect of waste, we find that the multiplication of seeds or germs is no matter of chance, but is in proportion to the chances of survival, and that it decreases rapidly as we rise in the scale of living beings. In the absence of such differences in prolificity, the balance of life on the globe would not be preserved. In short, under the sway of Natural Selection, the seeming imperfections are found to be products of a process which manifests a constant striving towards fuller life.

I do not say that this evolutionary explanation altogether removes our difficulties—but I do say that it goes much deeper than any we before had attained to. The puzzling cases become instances of a process which displays directivity and purpose. The ultimate perplexities will not be shirked when we come to grips with the sinister problem of evil.

A COSMIC DESIGNER

We have discovered good grounds for keeping faithful to our intuition of the existence of purposeful activity in the Cosmos—an activity conceived on the analogy of that which falls within our individual experience as purposeful agents. The intuition is raised to the rank of a reasonable hypothesis. On the principle laid down, then, we are further justified in the inference that the Ground and Source of the process is a Being capable of purposeful activity—capable of forming a plan and working it out by adaptation of means to ends—in short, a Designer.

The scientist, on the very partial evidence before him,

has faith in " the order of nature." He accepts without proof the universal reign of natural law, and unless he did this, there could be no science at all. Can he reasonably deny the same liberty to the teleologist who assumes a Designer because he finds that otherwise he has no adequate basis for his cosmology ?

If the scientist objects that the concept of purpose is read into the facts, and is not sensibly manifest, the reply is obvious. In the concept of law there is the same subjective character, stripped of which the universe is reduced to a mere series of happenings—of bare facts without connexion. The scientist reads into them causation and order. Why should he regard as irrational and unallowable the reading into it of purpose ? No, we are all alike bound to interpret phenomena on the basis of subjective experience. Anthropomorphism of some kind is inevitable ; our truest wisdom is to recognize this fact, and, while on our guard against a too facile acceptance of subjective leadings, to trust ourselves without prejudice to the reasonable interpretations it suggests. And eminently reasonable, as I have tried to show, is the recognition of design in Nature, and therefore the recognition of a Designer.

CHAPTER VII

CONSCIOUSNESS

We have seen that the phenomena of Force can be easily and naturally interpreted in terms of Will; but that the concept of Will, taken by itself, is too narrow to cover the manifold of experience. Schopenhauer introduces, indeed, the Idea as somehow coming on the scene and co-operating with Will. The connexion between the two, however, is left so indeterminate that it involves him in hopeless obscurities and inconsistencies. The ultimate Ground must be a living organic unity—nothing less than this can satisfy the demands of science, philosophy, and theology.

MIND IN RELATION TO MATTER

Pursuing, then, our search for an ultimate Ground which shall be adequate to the facts of experience, let us devote more special attention to the definitely psychical factors in that experience. And first let us try to bridge the fearsome chasm between mind and matter. A connexion between them has already been established—matter sets up resistances and oppositions which call for effort, and which so lead to the evolution of mind. But a "connexion" does not suffice us; we want organic unity and continuity.

There occurs to us straightway the familiar doctrine of the materialists that mind is a secretion of the brain, as bile is of the liver. This doctrine involves a melancholy confusion of thought which is now widely recognized. In the first place, there is the impossibility of establishing, on scientific lines, any real continuity

between brain processes and psychical experiences, or of discovering any real analogy between physical and mental causation. And, in the second place, the theory affords a glaring instance of putting the cart before the horse. Suppose one could examine a brain in full mental activity, and follow the physical movements of its molecules and currents, there would be nothing observable but matter in motion. On the other hand, for the owner of the brain, there is no physical phenomenon at all—nothing but thoughts and psychical experiences.

Now what do these facts imply? The actual thinker is the only observer who can get behind the physical phenomena of brain activity; and for him, the experience is psychical—a series of sensations, thoughts, and the rest. Indeed it is only by inference that he knows he has a brain at all. He uses his direct mental experience as a basis for inferring the existence of his body, of which his brain is a part. It is the direct mental experience that is primary; the recognition of the physical is dependent on it, and necessarily secondary. Clearly, if we are to set mind and matter as rival claimants for the rôle of ultimate reality, the claim of matter is inherently weak, if not absurd. Matter may, or may not, be able to justify a belief in its separate existence; but for us, constituted as we are, it is mind that establishes itself as our directly given, and therefore primary, datum. What the molecular conditions of consciousness may be is a burning problem; but the main issue, as just defined, is unaffected, whatever turns the controversy may take.

A thinker, then, with knowledge of the brains of others, by a subtle train of inferences, conscious or subconscious, comes to connect his mental experiences with the possession of a brain like theirs, and begins to speculate on the nature of the connexion between the inward and the

outward. If we are to have an epiphenomenon, or by-product, we must seek for it in matter, not in mind.

I have myself argued for the separate existence of matter; but I regard it as a peculiar mode of the manifestation of will; and I maintain that it is ultimately a system of stresses and strains due to the relations of an indefinite number of centres of the will-to-live, with a Supreme Will as their Source and Sustainer. We are within the sphere of experience; for we know how will can conflict with will. The evolution of brain may thus be looked upon as the manifestation of the increasingly complex relations of individual centres with the centres that form their environment. Hence the possibility of such a science as that of comparative psychology, which studies the relations between the mental development of the lower and the higher organisms, of children and barbarians, and so forth. There is parallelism between the evolution of mind and the growing complexity of nervous systems. To trace successive stages in the one set is at the same time to discover the successive stages in the other set.

EXPERIMENTAL PSYCHOLOGY

The new science of experimental psychology set out with the grandiose programme of altogether abolishing reference to conscious processes. Mental activity was to be reduced to data which could be measured and counted. I am far from saying that its results are not of value; but as regards its results—*parturiunt montes, nascetur ridiculus mus.* The reason is obvious. Immediate experience is the basis, the physical processes are matter of inference, and knowledge of them is bound to lag behind. The psychical is primary when we speculate about the nature of the ultimate Reality. And further, inasmuch as mind is not a perceivable object, our conclusions about this Reality can never rest wholly on

scientific premisses. Science can only trace physical types of cause and effect ; and these concern one aspect only of our experience, and that a subordinate aspect. Münsterburg cannot be deemed a champion of the spiritual interpretation of the universe ; and yet he has cogently shown that the new psychology must " abandon exaggerated devotion to the physical world, and must look out for the inner world." For " the inner life is not an existing, describable, explainable object, but a will-system to be interpreted and appreciated."

CONSCIOUSNESS AN ULTIMATE

In the light of these conclusions, let us turn to consider the cosmic implications of that mental experience which we call Consciousness. In the Cosmos there is not only existence, but conscious existence ; and consciousness must therefore be posited as an attribute or property of the Ground. Leaving on one side metaphysical questions as to how far, or in what way, the external world is dependent on the percipient mind, I simply assert the fact that the sciences themselves—physical, chemical, biological, and the rest—are dependent on consciousness for their existence. To assert a fact so obvious may seem unnecessary ; and, indeed, it should be unnecessary. But many apostles of science are strangely given to ignoring it, and proceeding as though cosmology had to deal with existence only—with mere happenings—ignoring the relation of consciousness to the physical phenomena which constitute their special field of inquiry. So far as pure science is concerned, the omission cannot be helped ; for consciousness is not an observable fact. But from the cosmological standpoint, the omission is inexcusable, and nullifies any system which is guilty of it.

Fortunately for the good name of science, there are others who fully recognize the function and significance of consciousness in the cosmic process. There are some

who go so far as to think it more than possible that Energy is conscious. With those who are travelling on this track I am in strong sympathy. For the purposes of the present argument, however, it suffices to insist that, as has been well said, " living science is a function of invisible conscious life " ; and that consciousness has an active function in determining the trend and goal of the developing universe.

KINDS AND LIMITS OF CONSCIOUSNESS

We cannot define consciousness—it is an unmitigated ultimate ; and is in this respect on a par with energy. As a general term, it embraces all modes and forms of self-feeling, and is almost synonymous with sentiency. The knowledge it gives is immediate, and therefore admits of no question ; any doubt that may arise concerns, not the deliverance of consciousness, but its interpretation. It involves the power of distinguishing feelings and state of mind ; and this power further involves a definite and genuine continuity. It compares and discriminates, because it has a unity of its own, and can unify the phenomena presented to it. It has two types, capable of fairly clear distinction—the presentative and the representative. The first of these includes the various kinds of sense-perception, and is the outcome of direct reaction to stimulus ; the latter includes all such workings-up and combinings of the data of experience as are characteristic of mental activity properly so called.

CONSCIOUSNESS IN THE ORGANIC

Consciousness, as thus described, is possessed in its fullness by civilized man. When we try to trace its presence in the grades of being below man, we find, as would be naturally anticipated, that its manifestations are less and less explicit as we descend the scale. But

there is no ground for denying some measure of it even to the lowest organisms. Protoplasm is unstable—Whence its instability? No less an authority than Cope attributes it to conscious effort, and maintains that life is "energy directed by sensibility, or by a mechanism which has originated under the direction of sensibility." May we not add that along with this sensibility there goes some minute degree of reason? Or, to put it in what would seem to be a sounder form—is not reason implicit in sensibility? If I like a particular kind of food, the feeling is equivalent to an affirmative; if I dislike it, the feeling is equivalent to a negative. The psychical impulse to self-maintenance and betterment, to the satisfaction of needs, appetites, and desires, is implicitly rational. There can thus be discerned a continuity of development between the affirmatives and negatives of sentiency, and the affirmative and negative propositions studied by logicians.

CONSCIOUSNESS IN THE INORGANIC

So much for the presence of consciousness throughout the organic sphere—it cannot be proved, but neither can it be denied; and the principle of continuity backed up by the observed facts of sentient existence renders a positive conclusion eminently reasonable. How does the case stand when we go below the organic into the inorganic sphere? Evidently it is here enormously more difficult to arrive at precise conclusions. Nevertheless, as I have in several contexts contended, the case is by no means hopeless. We have the leading of highly suggestive analogies; and as a basis we have the strong position defended by Schopenhauer that Energy is Will. Even Herbert Spencer is not afraid to commit himself to definite assertions on this subject. "The final outcome," he writes, "of the speculation commenced by the primitive man is that the Power manifested through-

out the universe, distinguished as natural, is the same Power which in ourselves wells up under the form of consciousness." Here is a passage from a thinker of a very different type. Royce * says: "We have no right whatever to speak of really unconscious Nature, but only of uncommunicative Nature, or of Nature whose mental processes go on at such different time-rates from ours that we cannot adjust ourselves to a live appreciation of their inward fluency, although our consciousness does make us aware of their presence." And a little further on: "Nature is thus a vast conscious process, whose relation to time varies vastly, but whose general characteristics are throughout the same. From this point of view evolution would be a series of processes suggesting to us various degrees and types of conscious processes. The processes in the case of so-called inorganic matter are very remote from us, while in the case of the processes of our fellows we understand them better." And yet, again, he calls Nature "a vast realm of finite consciousness, of which our own is at once a part and an example."

I adopt such teaching *ex animo*. For those who can follow it, there is no question of the limits of consciousness—everything is conscious; it is only a question of degree and stage, of plane and mode. And so far as our present range of experience is concerned, the degree of consciousness is determined by the complexity of the physical phenomena which constitute our aspect of its manifestation.

THE PSYCHICAL PRESENT THROUGHOUT

But even though these views be unacceptable, the presence of consciousness in the Cosmos remains a fact of our experience, and has to be reckoned with cosmologically. There are scientific thinkers who grant this,

* "The World and the Individual," vol. ii. p. 225.

but who hold that development in Nature did not start originally with psychical existence; that it has rather reached psychical life as its goal. This implies that what we perceive as matter, manifested to the senses as motion, rises to feeling and sensation; these elements, which constitute consciousness, have developed in unbroken sequence up to man.

I suppose this is the cosmological creed of great numbers who start from the premisses of modern science. And let it be noted, it does not deny spirit, nor is it materialistic. So far it is a distinct advance on the crudities that passed for wisdom in the eighteenth and most of the nineteenth centuries. Nevertheless, it is disloyal to *ex nihilo nihil fit.*

Von Hartmann's "Philosophy of the Unconscious" is fundamentally of the same character. He conceives that consciousness has been evolved out of a mode of being which did not originally possess it, and which is to lose it again when the cosmic process is consummated. His strongest line of argument is his appeal to evidence furnished by the gradual emergence of consciousness in organic evolution. But consciousness cannot be conceived as evolving. It is a definite mental state—an awareness. And apart from this objection, the system lies open to the same charge of disloyalty to *ex nihilo nihil fit.* If the Ground is really and truly unconscious, it can never evolve that which it does not contain. Remember, the concept of evolution does not apply to Being, but to Becoming. The conditions of the degrees and kinds of consciousness actually manifested by centres of the will-to-live are one thing—the being and nature of consciousness, in and for itself, are quite another.

STOUT AND MARSHALL

Stout, in his "Manual of Psychology," well states the position. Conscious process, he says, and the correlated

nervous processes must both "be regarded as belonging to a more comprehensive system of conditions; and it is within this system as a whole that the reason of their connexion is to be sought. In particular the individual's consciousness, as we know it, must be regarded as a fragment of a wider whole, by which its origin and its changes are determined. As the brain forms only a fragmentary portion of the total system of material phenomena, so we must assume the stream of individual consciousness to be in like manner part of an immaterial system. We must further assume that this immaterial system in its totality is related to the material world in its totality as the individual consciousness is related to nervous processes taking place in the cortex of the brain." *

The writers just quoted are looking at the matter from the provisionally adopted standpoint of the doctrine of psycho-physical parallelism. I myself look at the matter from the monadistic standpoint, and regard the physical side of the relation as one aspect of interrelated stresses and strains constituted by the activities of centres of the will-to-live. I do not systematically develop this monadism, because it is not essential to my main purpose. I am content to emphasize the primary and fundamental nature of consciousness, and the necessary inference from the fact to its Ground.

I have quoted somewhat freely in these last paragraphs. My reason for so doing was to show that a view which many may deem strange, if not bizarre, is gaining an increasing hold on many of the foremost thinkers of our day.

* "Manual of Psychology," p. 51.

CHAPTER VIII

FEELING

Rising above mere consciousness, though continuous with its development, come the whole range of mental states known generally as "feelings." We need not here draw any subtle distinctions between the active and the passive elements. I take the term to cover those specific states of consciousness known as emotions, passions, sentiments, and the rest, including, of course, the fundamental feelings of pleasure and pain. Our concern with these is to discover their cosmological significance and implications.

Historically viewed, and in this large sense, feeling has been developed in the organic world in ever-growing degrees of quantity, quality, and intensity. Beginning with almost undifferentiated sensation, sentient creatures have gradually learnt to smell, taste, hear, and see. The development is part of the cosmic process, and has been evoked in conscious centres by the forms and colours, scents and sounds of the external world. The interaction between sentient centres of the will-to-live and their environment has been continuous, and each side of the interaction claims recognition. If there were no rose there could be no experience of its scent: if there were no conscious centre possessed of the sense of smell, the existence of the scent, as such, would be similarly impossible. This reciprocity gives us a simple form of the fundamental antithesis between subject and object —an antithesis which plays havoc with any and every cosmology that shuts its eyes to the physical nature of existence as a whole.

The Cosmos, then, is so constituted that it develops specific feelings by specific means in specific sentient centres. Now the Becoming of this range of feelings is one thing; its Ground is another. To the former the concept of evolution applies, and not to the latter. In the Ground there simply "exists," timelessly, all that renders possible the time series in which these feelings have been developed historically.

WHAT IS FEELING?

Like will and consciousness, feeling is not to be defined. It cannot even be described. You cannot bring a man born blind to have any idea of the sensation of light: to be known, it must be experienced. Feeling, in fact, is that element in our nature which, as Hegel expresses it, "is the immediate, and, as it were, the closest contact in which the thinking subject can stand to a given content." Or, as Lotze puts it—"The sensuous impressions that perception yields are all equally inaccessible to thought: we *experience* their content, but we do not possess them by means of thought. What is good and evil can be as little thought as what is blue or sweet. It is only after *immediate feeling* has taught us that there is worth and worthlessness in the world, and taught us, too, the gravity of the distinction between them, that thought can develop out of this experienced content, signs which enable us to bring a particular fact under these universal intuitions. Love and hate, are they thinkable? Can their essence be exhausted in concepts?"

FEELING AND REALITY

Now if feeling be of this immediate, unthinkable nature, two things follow. Science cannot deal with it; it simply has to accept it as a fact which, save for its

relations to specific stimuli, escapes all methods of tracing links of cause and effect. And further, by its very immediacy, feeling brings us into touch with the ultimate nature of things far more intimately and directly than the use of scientific apparatus and formulæ. If we want to know what the Cosmos is, we must appeal, in the final resort, to feeling. The waves of light and of sound break in on our consciousness, but are transformed into a wealth of forms, fragrancies, colours, harmonies, with which, as such, science can never deal.

Once more, then, we discover how impossible it is for science to frame an adequate cosmology: even reason itself has to own its impotence in face of the problem taken in its entirety. Not that for a moment I would put feeling and reason into essential opposition. I only contend that feeling presents the material on which reason goes to work, and is therefore of primary import. Descartes, the father of modern philosophy, took as his ultimate fact, "I think, therefore I exist." It would be still more fundamental to say, "I feel, therefore I exist." And it therefore follows that, if we would understand the nature of the Ground of the process, we must posit feeling as an essential.

This is not to say, however, that feeling can by itself supply the deficiencies of science. Though feeling cannot become material for science, it can be guided, stimulated, and expanded by reason. Indeed, it is not until reason co-operates with feeling that feeling can even know itself, or advance beyond the impressions of the moment. In framing a cosmology, then, feeling must have a fundamental place, but cannot stand alone. Reason is necessary for the development of its higher modes and planes. The artist, the poet, the musician dive deeper into the reality of things than the scientist. But what they find there must be distilled in the alembic of reason before it

can exert its full influence, or be granted its due place in the manifold whole.

FEELING IS AN INDIVIDUAL EXPERIENCE

One characteristic of feeling is that in a peculiar sense it is individualistic—inalienable from the individual centre of the will-to-live. Others may sympathize with us, and, through the power of imagination, may produce in themselves the same kind of feeling; but they cannot experience our actual feeling, nor we theirs. Here is another reason why it is inaccessible to scientific methods. Nevertheless it is a reality—and, indeed, for the individual the most realized of all realities. We are thus led to surmise that the Ground of our being, if this Ground has feeling, must also be in some sense an individual. I merely mention this point in passing, leaving it for development at a later stage.

VALUE JUDGMENTS

Feeling issues in what are called "judgments of value." An important distinction is now generally recognized between judgments of value and judgments of description; the former are held to rest on feeling, the latter on reason: the former are immediate, the latter discursive. The result of a judgment of value is the defining of a peculiar relation between the percipient and the object perceived, and its content is wholly internal and subjective.

For conscious centres sufficiently developed to form such judgments, the world presented is not an indefinite multiplicity of objects related only by mechanical or logical laws, but a varied succession of stimuli which arouse varying degrees of liking or dislike according as they help or hinder the will-to-live. It is easy to see that a man whose mental activity should be nothing but pure perception, or pure reason, and who could make no

judgments of value, would have no preferences or desires for one object rather than another. All would be alike of equal importance or unimportance—all alike would for him simply exist, or simply happen. No inclination or aversion, no special interest would guide him ; his life would pass on in unruffled stream.

Such a life would be that of an ideal scientist, *qua* scientist. He would thus be an achromatic medium for observing and classifying facts. He would be swayed by no likes and dislikes, by no interests or affections, by no distinctions between good and evil, just and unjust, ugly and beautiful, sublime and insignificant. Each object or event, as it came before him, would be registered with a detached impersonality such as that of a mirror or a phonograph.

Such would be our ideal scientist. Would he be an ideal man ? The question answers itself. We should rate him hardly higher than a superior Babbage's calculating machine. *Qua* scientist, he would be valuable. But we should not go to him for a complete cosmology ! Nearly everything that makes life what it really is to us would be out of his reach. The world of meanings and values would for him be non-existent.

Now all that applies to our estimate of the value and function of such a man applies to our estimate of the value and function of science. We have to fall back on the deeper factors in our being which prompt judgments of value. Science adds to the number of facts which provide material for such judgments, and so aids us, indirectly, in attaining the knowledge which it cannot itself achieve—that of the nature of the Ground which originates and sustains the manifold of our experience.

COSMIC EMOTION

Feeling passes into conscious reflection and into reasoning. It is thus that we can explain the experience

known as Cosmic Emotion. The unity of all modes of Being and their deeper significance force themselves at times upon our attention by the sheer weight of the feelings evoked. Carlyle, looking up at the starlit heavens, exclaimed to a friend—"Man, it's just dreadful!" And even Herbert Spencer, constitutionally determined to keep to facts and to comments upon them, rather than to imaginative or poetical treatment of them, confesses to the same emotion. "Of late years," he writes, "the consciousness that without origin or cause infinite space has existed and ever must exist, produces in me a feeling from which I shrink."

Such cosmic emotion is feeling of exalted character mingled with intellectual concepts, and conscious of a mystery beyond. It is thus no empty stirring of a futile sensibility: it is deep calling unto deep. Mere intellectual knowledge can never satisfy man's questionings, just because man's nature, and the cosmos of which he forms a part, are more than bare facts, and so stimulate his feelings. They come to him fraught with values and meanings, and vaguely suggest modes of experience which are "felt" to be there, but which are not as yet intellectually apprehended. They arouse premonitions of worlds not yet realized.

THE BEAUTIFUL

Among the highest products of emotion and sentiment is a sense of the Beautiful. There have been many attempts to define it, and even to discover its physical basis. Physiology has a good deal to tell us of the mechanism by which the Beautiful is perceived; and its teachings are supplemented by those of experimental psychology. But the secret of what constitutes beauty is still unsolved. One reason of the failure is obvious—the solution lies so largely in the sphere of feeling, and is therefore outside the range of science.

What concerns us here is the simple fact that we are so made that we respond to the appeal of beauty, that we are moved by it, and derive from it some of our most exquisite pleasures. The fact is there, and has to be reckoned with in cosmological speculation. Again we infer from the fact to the Ground, and argue to an element of beauty in the Being behind the process. In recent times (not to speak of Plato) there have been not a few attempts to find a proof of the Theistic position in the marvellously varied beauties of external nature. Without laying too much stress on the more ambitious conclusions thus reached, we may at least, with Schopenhauer, declare that the will objectified in tree and shrub, mountain and waterfall, is a wonderfully pure expression of the underlying Ideas, and therefore of the nature of the Being which expresses itself in these forms.

Nature is not merely passively beautiful. As Ruskin so often insisted, she makes a positive effort to be beautiful. A scar on a mountain-side is soon exquisitely coloured by wind and weather, clad with mosses and creepers, and veiled by delicate shrubbery. And this effort is manifested throughout. Consider the beauty of the crystal world, and how the damaged crystal will repair its form. In short, there is not only a will-to-live but a will to attain to beauty.

It is true that there are things ugly as well as things beautiful, and that these have also to be reckoned with. Much of the difficulty we here experience no doubt arises from the relativity of our judgments : we are still sadly anthropocentric, and frame our standards on grounds which are deeply coloured by reference to the satisfaction of human desires. But, allowing for this, there is a residuum which is formidable in quantity and quality. The same line of argument, however, applies to this problem as to the problem of imperfections and useless survivals in the products of organic evolution. The

world is not ready made, but is in the making; and what we have to discover is the general trend of things. There is transition from stage to stage and from plane to plane, and the transition in every case is effected by effort and striving. Our cosmology, therefore, must allow for imperfections manifested in the course of the striving. The amount and the quality of beauty in Nature is overwhelming—we start with this as positive fact. And we supplement it by tracing the trend to the attainment of still further beauty. The goal is seen to be the elimination of the ugly and the development of each type in its perfection. We have loose shapeless stones gathered together into the primitive cairn—these same stones massed and wrought into the Lion Gate at Mycenæ—these same stones sculptured and sublimated in the glory of the Parthenon. Emerson clearly apprehended the inherently natural character of the continuity manifested in this effort to realize the Beautiful:

Earth proudly wears the Parthenon,
As the best gem upon her zone,
And morning opes with haste her lids
To gaze upon the Pyramids;
O'er England's abbeys bends the sky,
As on its friends with kindred eye;
For out of Thought's interior sphere
These wonders rose to upper air;
And Nature gladly gave them place,
Adopted them into her race,
And granted them an equal date
With Andes and with Ararat.

ART

I have mingled together the beauty of Nature and the beauty achieved by conscious art; and I have done this advisedly: for I hold that there is organic continuity of process. The outer world of colour, light, and form stirs

to its depths the soul of the artist, just because the artist and his outer world are essentially one. So with the musician who catches melodies and harmonies that are implicit in his world. So with the poet who welds together in conscious unity the beauties of external Nature and of the inner world of his experience. As Wordsworth has finely said : poetry is " the impassioned expression which is in the countenance of all science."

Art, even though it were only a " play " instinct, is bound to have its weighty significance for the cosmologist ; much more so when we realize its deeper meaning and its more august functions in developing the highest qualities of self-conscious mind. It gives concrete form and expression to most of our highest judgments of value —stimulates the formation of ideals—moulds character —changes the face of civilizations. In æsthetic perception and production the soul of man enters into fruitful communion with the greater soul of which his forms part, through the immanent beauty which pervades the Whole. Kingsley was looking at some lovely work of art in a London shop window, and at his side was a labourer attracted by the same object. Their eyes happened to meet ; and to the lips of each there sprang at the same moment the involuntary ejaculation : " Is it not beautiful ? " Which thing is a parable. External beauty of every kind, wherever met, can be perceived by us because of the common impulse that runs through every part of Nature to struggle towards æsthetic form in the will-to-live. Beauty has a material basis. Why ? Because what is known as matter is really mind, and can thus play its part in evolving the full and complete life which is the goal of the process.

FEELING AND REASON

The connexion between feeling and reason has already been touched upon ; but a few further words are neces-

sary to define the larger issues. Huxley contended that feeling is the servant of intellect : Herbert Spencer, from a fuller array of data, reversed the relationship : Bergson has gone yet further, and subordinates reason to intuition. The last of these could take us into regions transcending our present subject. Herbert Spencer's conclusions are more relevant. He agrees with Huxley in assigning a rôle of enormous importance to reason ; but he unhesitatingly affirms that " the essential element in life is not reason, but feeling in its double rôle of sensation and emotion." It is at any rate clear that if we would understand the cosmic process, and attain to adequate ideas of the nature of the Ground, we must give most serious heed to feeling.

But we must guard against assuming that the mind is constituted of various separate faculties. For convenience of discussion, we distinguish between consciousness, feeling, reason, and the rest. But these are simply different manifestations of one fundamental activity. Sully on this point is clear and forcible. " It is evident that in spite of the fact that intellection, feeling, and active impulse are distinct psychical forces or tendencies, and that in their most energetic forms they assume the aspect of hostile or incomparable tendencies, they are organically implicated, so that there can be no normal and complete development of one without a concurrent and correspondent development of the others. In other words, the highest development of feeling, of thought, and of volition is a phase of a complete development of mind."

My own conviction is that, while feeling has its peculiar function, it will become more and more interpenetrated by reason ; or, to put it in terms more in accord with my affirmation of continuity, as man's nature develops, sensation will manifest with increasing fullness its implicit reason, and reason will tend to lose

itself in the glow of intuitional feeling. That is to say, mental evolution will culminate in immediate understanding of, and sympathy with, one's total environment.

MIND AND THE GROUND

We have now considered the nature of will, consciousness, and feeling sufficiently to allow of certain definite conclusions. Reason itself, the religious emotions, and the supreme emotion of love, are reserved for special treatment. Taking our premisses as they stand, we may infer that the Ground of our being is sentient—possesses feelings and emotions—is guided by ideals of beauty. We have thus travelled far from the conception of a materialistic universe, and almost as far from that of a blindly heaving Will. We are well on the way to the recognition of a Personal Being, always and everywhere active in the process which He initiates and sustains.

CHAPTER IX

REASON

We now come to a fact in our experience which has on several occasions asserted itself, but which has not received attention on its own account—the fact of Reason. In the Cosmos we find that there are beings who not only possess will, consciousness, and feeling, but who can swing clear of immediate perceptions; who can frame general notions and combine them in propositions, syllogisms, and the rest—in brief, who can exercise reason. Again we infer that, since this reason actually exists, it must be assumed, on peril of disloyalty to *ex nihilo nihil*, to be an attribute or property of the Ground. Let us develop this section of the argument.

MY OWN PHILOSOPHICAL POSITION

The idealistic philosopher contends that the external world is not real apart from thought, or even that it is nothing but thought. I do not adopt the idealist's proposition, nor are its characteristic doctrines either adverse or favourable to my general argument. The facts of experience are what they are, whatever philosophy may have to say about them. My own views might be classed as Idealistic Realism, or Realistic Idealism, with a monadistic basis. That is to say, I hold that there is a real world external to the minds of individuals, but this world must be construed, ultimately, in terms of mind. The ultimate "reals" I hold to be individual centres of the will-to-live, dependent on a self-existent and supreme Individual—God. The world external to mind thus becomes the product of the rela-

tions between the Supreme Being and the dependent monads, and between the monads among themselves. I mention this in order that my own philosophical position may be clear. But again I point out that the facts of experience are what they are; and it is on them, taken in and for themselves, that my argument relies. Naturally I give emphasis to the views which I have espoused; but the inference from the facts to the Ground is just as cogent for all who accept experience in its entirety.

REASON IN THE WORLD EXTERNAL TO MIND

Now what are the simple facts about Reason? As stated above, it most certainly exists. But the question arises—Does this faculty of reasoning exist only in individual minds, or is it manifested in the world considered as external to individual minds?

It cannot be denied that the external world often responds, or corresponds, to our individual thoughts. For example, Kepler discovered the concepts that explained the motions of the planets. But he did so, as he himself tells us, because God had these thoughts before Him, and he could thus "think them after God." In other words, the motions of the planets responded, or corresponded, to the results of his calculations. And this is true of science as a whole in so far as the hypotheses and formulæ it frames are in accordance with the facts. The Nautical Almanac is a mass of reasoned anticipations of the course of the stellar universe. The physician depends on the results of reasonings concerning the functions of the human body, and the effects upon them of the various modes of treatment he may prescribe. And so on throughout. Mistakes, of course, are made; but these are attributed to the insufficiency of the data, or to errors in reasoning, not to the failure of the rational element in Nature herself. Moreover, great discoveries are often the result of reasonings which are found to be

verified subsequently by application to the phenomena concerned. Thus, though we may not be able to follow Hegel, and roundly affirm that the rational is real and the real rational, we must at any rate acknowledge the presence of a rational element in Nature. This suffices for our cosmology. This reason must have its undeveloped Ground.

LOGICAL UNITY OF NATURE

We have considered the physical unity of Nature—its correlative is the logical unity of Nature. Thinkers are ever striving to bring all the varied phenomena of the universe within the pale of their reasoned conclusions—to show that the Whole forms a system of rationally related parts. Certain scientists, in a not inexcusable reaction from an exaggerated trust in abstract reasoning, have shirked the implications of the aim they have in view—the discovery of a unity that can be seized and manipulated by the intellect.

The bonds that connect into a whole the varied phenomena—inorganic, organic, psychic—presented in experience are amenable to treatment that is in accordance with the laws of reasoning. Indeed, it is very largely, if not altogether, by the interaction of our minds and these phenomena that we come to a conscious apprehension of the laws of thought, and are led to distinguish and define them.

And what is the inference? On the one hand, we have Nature with her inexhaustible wealth of phenomena; and on the other, we have the human mind, gradually discovering order in the seeming confusion, and bring more and more of the phenomena under the thought-defined and thought-connected sway of intelligible system. The cosmic process, therefore, in its progress from cosmic vapour to sun and planet, from sun and planet to mineral, crystal, and protoplasm, from

protoplasm to organisms and to minds—this cosmic process has itself developed the logic which was implicit, or, rather, immanent in it. This logic, again, was implicit or immanent there because it existed in its fullness and completeness in the Ground of which the Cosmos is a manifestation. We can therefore sympathize with the train of reflection which prompted Goethe to write thus : " I ask not whether the Supreme Being *has* reason and understanding : for I feel that He *is* reason and understanding itself. Therewith are all creatures penetrated, and man has so much of it that he can apprehend the Highest Being in part."

CHARGE OF ANTHROPOMORPHISM

The subject of anthropomorphism has received special attention. But it is worth while to examine more particularly its bearing on our recognition of a rational element in Nature. For it is by no means an uncommon charge that we are here especially prone to read ourselves into Nature. The *ad hominem* argument would suffice that we are part of Nature, and therefore cannot be wrong in reading ourselves into Nature. The philosophy which maintains our integral unity with the whole process, and yet refuses to accept the conclusions that inevitably flow from this premiss, cannot long occupy the attention of those who have any regard for consistency.

" The nature process," says Hertwig, " resembles a process of thought." We may look at this fact from another side. The more carefully we follow up the genesis of human thinking, the clearer does it become that our thinking is conditioned by, and is a reflex of, the external world. Thought, at first, is merely the perceiving of facts and their relations. We see it in the animal who recognizes objects and situations, but is probably unable to form any general notions on the

basis of its percepts. (I except certain reasoning processes in some of the higher animals.) This mode of thinking by simple percepts can become very complex and advanced. Skilled artisans and players of games, for instance, achieve rational ends without discursive thought. The higher forms of intellect are not different in kind, but only in degree. And just as the sense organs, such as the eye or the ear, have been developed by the stimuli that come from the outer world, so is reasoning power a special adaptation of the mind which enables it to apprehend certain elements in the same outer world. That is to say, reason reveals to us real factors in a real world, because it has been evoked in response to stimuli from a real world, and corresponds more or less perfectly (as with eye or ear) to the reality which is its basis. True it is that, as Bergson contends, the intellect cannot present to us the full reality ; but it is none the less true that it is stimulated by that reality. The reason in the world external to the individual mind stimulates and develops the reasoning power which exists potentially in the individual centre of the will-to-live. Anthropomorphism, in regard to the recognition of reason in the Cosmos, is thus seen to be, not simply inevitable, but essential ; for unless reason were there we should not be rational beings. Let it be noted, however, that reason is not to be confused with " process of reasoning," or " discursive reasoning." If we had perfect knowledge of all the facts and of their implications, discursive thought might not be required—but reason would still be reason. A man may perceive by direct insight the truth of some Euclidean proposition ; but the truth perceived does not thereby cease to be rational.

INSTINCT

At this stage there come to mind the marvellous and mysterious phenomena of instinct. Schelling went so

far as to say that in these, could we understand them, we should have a master-key to the final problems of existence. Let us take a simple instance. The larvæ of the stag-beetle bury themselves in the ground to undergo their final transformation. The female larva makes a hole as big as herself; the male larva makes a hole larger than himself. Why this difference? In the case of the male, there must be room for the horns to grow! Now the creature was never taught to act thus; he knows nothing about the horns that are to come; and yet he definitely provides for them. That is to say, there is action with an end in view, which end is unknown to the agent. Have we not here a case of implicit reason in natural process? It matters not how the mechanism of the instinct has been built up, the fact remains that a result is attained similar to those which we attain by the use of reason.

Bergson is so impressed by the phenomena of instinct that he sharply separates them off from rational processes, and even sets them in antagonism to those processes. His criticism may be sound; but it concerns discursive reasoning only, not reason as such. The beetle is a part of the cosmic whole; it is permeated and actuated by forces and psychic impulses which belong to the universal system of things. In short, the Cosmos is inherently rational.

We are thus led to recognize in true instincts—such as that of the stag-beetle, the activities of bees and ants in the ordering of their commonwealths, and the rest—the presence of reason. Maeterlinck supposes, in the case of the bees, "a spirit of the hive"—a startlingly pregnant thought! For it suggests a world-soul which includes the bees and all else that manifests adaptation for future needs, and, indeed, all interdependent adaptations of every kind. And we advance beyond this again to the thought of the universal Ground—the Supreme

creative Source. And we see in that self-existent Being the presence of Reason, guiding the Will, the Consciousness, the Feeling which we have already discovered there.

PANLOGISM AND PRAGMATISM

Hegel and his followers have exaggerated the cosmological import of reason to such an extent, and have so lost themselves in the logical development of abstract concepts, that they have provoked the reaction known as Pragmatism. The revolt is against the limitation of our outlook to what is called "pure" reason, divorced from all the complex activities which go to make up our total experience. With this revolt it will have been apparent that I am in keen sympathy. But it may be useful to show that the repudiation of this Panlogism is not equivalent to the introduction of an irrational element into the Cosmos.

I agree with the Pragmatists that the supposed sufficiency of "pure" reason is quite as unjustifiable and quite as harmful as the supposed sufficiency of the abstractions of materialistic scientists. Bergson has surely convinced us that the human intellect has been developed as a factor in the struggle for existence. And hence, as F. C. S. Schiller says: "It must follow that the practical use, which has developed it, must have stamped itself upon its inmost structure, even if it has not moulded it out of pre-rational instincts." Or again: "Our knowing is not the mechanical operation of a passionless 'pure' intellect which

Grinds out Good and grinds out Ill,
And has no purpose, heart, or will.

Pure intellection is not a fact in Nature; it is a logical fiction which will not really answer even for the purposes of technical logic. In reality our knowing is driven and

guided at every step by our subjective interests and preferences, our desires, our needs, and our ends. These form the motive powers also of our intellectual life."

This typical utterance of a typical Pragmatist says no more than I have urged in the chapter on Feeling; but gains its special force by its connexion with the controversy that rages round the problem of Truth. Our affair is with the cosmological function and significance of Reason. It may be interesting to put alongside of Schiller's statement a passage from M'Taggart, a leading Hegelian who has recognized, while loyal to its main principles, the insufficiency of Panlogism as the sole basis of a world-view. "Knowledge, volition, and feeling remain, in spite of all such attempts [as Hegel's], distinct and independent. They are not indeed independent in the sense that any of them can exist without the others. Nor is it impossible that they might be found to be aspects of a unity which embraces and transcends them all. But they are independent in so far that neither of the others can be reduced to, or transcended by, knowledge."

But, as in the case of the distinction between discursive reasoning and reason in and for itself, we must guard against thinking that because there is a sphere of Reality which remains outside that of intellectual knowledge, there is also a sphere which is irrational. This was one of Schopenhauer's mistakes. He was so determined to glorify his Will as the unique first principle that he declares it to be, not merely "not knowable," not logical, but something positively a-logical, blind, irresponsibly autonomous. Hence the insurmountable difficulty which faced him of evolving a rational world from something that is purely irrational. Indeed, it is "absurd," as one of his exponents says, to try to describe the world in terms of a principle which is essentially unknowable.

We can hold, then, that the Cosmos is not "pure" Reason, and that it has elements which can never be reduced to Reason; but we can nevertheless hold that it is pervaded and guided by Reason. Our inference, therefore, from the fact to the Ground, holds good in a universal sense. The Being behind the process is free, indeed, but is essentially rational in His nature and in His activities.

REASON AS THE HARMONIZER

We are now in a position to gauge the cosmic function of reason. In what has preceded I have taken Zola's point of view. "Nowadays," he said, "we must abandon the study of the metaphysical man of the years gone by, for an inquiry into the physiological creature of our days." I have traced the development of man, as the crown of the process (so far as it is revealed in our experience), from the physical plane called inorganic on to the plane of the organic, and on again to the plane of mind—consciousness, will, feeling, reason. I have contended for continuity throughout—for the actualization of potentialities in and through an environment of increasing complexity.

The special function of reason is to harmonize and unify the varied materials presented in our experience taken in its entirety. Working slowly upwards, it combines its data into increasingly coherent systems, struggles to dissolve contradictions, gives greater exactness to loose generalizations, and enables us to live our lives, not only with an expanding command over our environment, but with ever more definite purpose.

Our belief, then, in the rationality of the universe is not inconsistent with full acceptance of the conclusions of natural science, nor in antagonism to scientific methods of inquiry. But the reconciliation of science with the deliverances and aspirations of will and feeling

depends on going behind the phenomena of Becoming to their Ground in a Being Who simply exists, and Who rationally works in and through the cosmic process for the attainment of a definite goal. As Watson so strikingly and so profoundly puts it:

God on His throne is
Eldest of poets;
Unto His measures
Moveth the whole.

PART V
MORAL AND SPIRITUAL FACTS

CHAPTER I
CONSCIENCE

Conscience! Assuredly an outstanding fact of our experience! It seems to lift us away from the world of physical law into another so different as to have a detached and independent existence. We have the moral "ought" opposed to the factual "is." Reason may be apprehended in the trend and order of material process; beauty may be surmised to have a physical basis—but what of this "ought"? Is it not too ethical, too spiritual, to mingle with material process, or even with organic evolution? Does it not come to us, as so many moralists have taught, from another sphere, and speak to us in a voice that demands unconditioned as well as unconditional obedience? Is it not girt about with uniquely august and supernatural sanctions? Such questions as these present themselves when we would examine the moral sense and its implications in the light of the principle of continuity—when we would attempt to show that, like reason, it is immanent in the world-process.

Let it be premised that here, as in previous cases, the facts of the moral life are what they are, let our theories concerning them be what they may. Their cosmological bearing in regard to inference from fact to Ground is unaffected by our personal views of their genesis and connexion with the other facts of experience. Nevertheless it will add to the completeness of our line of argu-

ment, and also strengthen the insistent inference, if we can succeed in putting conscience upon a cosmic basis instead of regarding it as something extraneous to the " natural " order.

DEVELOPMENT OF THE MORAL SENSE

It is encouraging at the outset to find that the moral sense has had an undoubted development. It is not necessary to traverse familiar ground, and treatises on ethics from the evolutionary point of view are plentiful. It cannot be longer maintained that a clear and full intuition of moral principles is universal; moreover, the moral systems, crude or advanced, that have actually prevailed in the world, differ in contents as well as in the degree and intensity of the moral feeling which has prompted them. True, there is always and everywhere a more or less clear distinction between right and wrong—for until this exists there can be no really moral choice at all. It is true, also, as we shall see, that in a certain sense, the power of drawing the distinction is innate. But to grant this is not to rule out evolution.

Certain evolutionists, in reaction from the older dogmatic ethics, have denied that there is any special character in the moral sense; they have argued that it is a natural phase of the desire for pleasure (individual or collective), or that it can be resolved into a sense of approbation of what is " useful " to the individual or to the social group. Hence a purely " naturalistic " ethics. But just as Schopenhauer could not deduce the rational from the irrational, so the naturalistic moralists cannot deduce right and wrong from the pleasurable or the useful. A most unfortunate outcome of this attempt has been that many have come to believe evolution to be incompatible with, if not opposed to, a genuine ethics. I shall try to show that the cosmic process, if it is to

have a meaning and a goal, must also have an implicit or immanent ethics.

MORALS AND EVOLUTION

Let us start with the existence of centres of the will-to-live, brought into relations with one another, and mentally influencing each other's development. Right relations advance, wrong relations retard, that development. The right relations do not come into existence automatically—they have to be learnt: they require adjustment. Morality may thus be regarded as concerned with those relations which favour the full and highest development of the centres individually and corporately. Until conscious reason arrives on the scene, this morality is implicit; but as soon as the centres are conscious of themselves, can form ideals, and can shape their own conduct in rational accordance with their ideals, morality can become explicit—that is to say, there can be definite choice between lines of action which are referred to a standard established by ideals. The cosmic process itself presents and evolves the distinctions of "higher" and "lower"—true morality arises when these are consciously apprehended and serve as motives to action. In other words, the process itself suggests that if two impulses are present to the mind, one is "higher, worthier than the other"; and recognition of right and wrong comes to the birth when conscious choice is made between them.

We thus see how there can be an evolution of the moral ideas. In proportion as men grasp intuitively, or intellectually, what is "due" to themselves and "due" to other centres of the will-to-live, in that proportion will they give fullness and content to the idea of "duty." And since the natural order is, relatively speaking, fixed, and since the conditions of development are so largely determined from without, we have a broad parallelism

in the various areas of ethical development, and an increasingly strong sense of an "imperative" which demands obedience. The moral standard develops concurrently with the development of feeling and of knowledge. In short, given that the world-process is directed by a rational Will towards the attainment of a definite goal, the phenomena of conscience are bound to arouse a moral sense in the minds of beings who, as parts of that process, have consciously apprehended the conditions of their development and the trend of the process.

DEVELOPMENT OF INDIVIDUAL CONSCIENCE

If the individual is, to a considerable extent, a microcosm, repeating in his development the characteristic stages of the macrocosm, it will be suggestive to consider how conscience grows and asserts itself in his experience as a moral agent. When shall we say that the moral sense makes its appearance? Is it in the embryo; or at birth; or in infancy; or at years of discretion? It is impossible to fix any definite time; here, as in the dawn of reason, there are stages. The potentiality is there from the first, but it requires successive changes of relation to environment to actualize it. And the process is one of interaction between the subjective and the objective; as in the case of the sense of smell and the scent of the rose, there is interdependence. The child brought up in a savage tribe, or in China, or in Germany, or in England, will have corresponding characteristics in moral development. So with an individual English child—there is the nursery, the family circle, the school, the widening social group—each with its own special contributions to the development of the moral sense—each and all integral parts in the cosmic Whole.

MORALITY A SOCIAL PRODUCT

From what has preceded, it will be evident that I regard morality as eminently a social product, and that

I derive its peculiar force and authority from the nature of the process which sets individually developing conscious centres into certain relations with one another and with their common Ground. Thus regarded, we shall not expect to find any bare, abstract, and impersonal principles, such as lead to a concept like that of Kant's Categorical Imperative. There is no breach of union between the various elements which constitute individual development any more than in the processes of the universe at large. In the case of justice, for instance, there is no detached principle dwelling aloof from all particular instances of its application, but a specific set of right relations between individual wills and between groups of wills. Perfect justice is thus perfect rightness in those relations. We approximate to it by painfully slow steps; but the steps are not hard to trace when we study history on the large scale.

IS NATURE MORAL?

There are not a few thinkers—even Theistic thinkers—who call Nature blind and indiscriminating, a-moral if not im-moral. I hold such judgments to be hasty and unfounded. There is, indeed, the sinister problem of evil to be grappled with. But instead of being an argument against a moral element in Nature, it suggests such an element. For the very existence of the problem shows that we make moral demands on Nature, and expect them to be satisfied. Moreover, there is also a correlative problem of good. For when we study natural processes more deeply, there are abundant evidences that they are charged with moral purpose.

If we follow the evolution of the moral sense down into subhuman forms of existence, there is readily apparent a distinctly altruistic strain. We have but to remember the social instincts of insects, birds, and animals. And looking at organic evolution as a whole, we can see that

development depends largely on acts which concern the species in contradistinction, and even in opposition to the welfare of the individual. The struggle for existence, in its competitive form, bulks less and less as we rise higher in the scale, and the social, or benevolent, tendency bulks more and more largely. And further, the more the altruistic factor in evolution asserts itself, the richer does life become in value and in happiness. That is to say, though we cannot yet show that the Cosmos is moral through and through, the moral factor plainly asserts itself as of growing importance for the attainment of the higher ends which are coming into view.

As in the case of consciousness, we cannot place lower limits to the presence of this moral factor in the behaviour of the existences in the cosmos. The germ of it is there from the beginning. What Wallace excellently says of organic activities is true, in measure and degree, of all the co-operating modes of existence that go to make up the total complex: "Capacity for acting in concert for protection and for the acquisition of food and shelter; sympathy which leads all in turn to assist each other; the sense of right which checks depredations upon his fellows; self-restraint in present appetites; and that intelligent foresight which prepares for the future, are all qualities that from their appearance must have been for the benefit of each community, and would therefore become the subjects of natural selection."

All this is based on a development which rises up by insensible stages from the inorganic, and which retains its basis in the inorganic; the curve of altruism has been ever upwards. It is most easily traced as we ascend the scale of the vertebrates, and it culminates in socialized man. The undue emphasis on the competitive factor in evolution has diverted attention from the altruistic, which is gradually eliminating, superseding, or transforming it.

THE HIGHER STAGE

On the practical import of morality in the highest manifested stage of the process (the human) it is not necessary to enlarge. Matthew Arnold said that conduct is three-fourths of life. And without unduly extending the meaning of the term conduct, this is assuredly true, even if it is not an understatement of the truth. Presentation, feeling, willed action, rational action, moral action—all these are welded into an inseparable whole. The value of the last factor—moral action—increases with the advance of civilization. It is only because will and reason are being socialized—that is to say, moralized—that real progress is possible. This fact finds convincing illustration when we reflect on the destinies of nations and watch the working of those silent forces which are among the most fruitful means of judging the trend of the world-process.

The fact of the matter is that the moralizing process is in line with the older struggle, in so far as there is will to fuller and richer life. "I do not suppose," says Leslie Stephen, "that anybody would deny that the more moral the race, the more harmonious and the better organized, the better it is fitted for holding its own. But if this be admitted, we must also admit that the change is not that it has ceased to struggle, but that it struggles by different means. It holds its own, not merely by brute force, but by justice, humanity, and intelligence, while, it may be added, the possession of such qualities does not weaken the brute force, where such a quality is still required." * This was in answer to Huxley's contention, in his famous Romanes lecture, that the ethical progress of society depends upon our combating the "cosmic process" which we call the struggle for existence; and it seems to me to be a complete and profoundly suggestive answer.

* "Social Rights and Duties," p. 250.

No doubt Huxley had not intended his idea of " reversing " the cosmic process to be taken too literally ; he merely desired to emphasize the distinction between ruthless struggle and moral co-operation. But however this may have been, the point remains that the process is not reversed, but advanced. The moralizing of the struggle is a better means of attaining the end which that struggle has in view—fuller and richer life.

CONSCIENCE AS INNATE

A strong point made by the older moralists was that conscience is " innate." The evolution hypothesis has no need to shirk the issue thus raised ; for it lays ample stress on the factor of heredity. It may reasonably be objected to the doctrine of innateness that it is only true, in any adequate degree, of the civilized peoples. But waiving this point, if conscience is innate, so are instincts, so is common sense, and an indefinite number of other factors in our complex being. And what does this imply ? The constitution of the cosmos is such that it builds up in nerve and tissue, structures which embody and transmit the willing, the capacity for feeling, and the thinking of the generations that are past—the willing, the feeling, and the thinking being throughout stimulated by the environment.

But there is another point to be observed. Man inherits an instinctive judgment in matters of right and wrong ; but this instinctive judgment does not preclude his having a sense of individual responsibility. Self-consciousness takes its part in making specific decisions ; and this constitutes a peculiar characteristic of his advanced stage in the process. This power of individual choice does not, however, separate him from the process in which he is immersed ; it only enables him to be a conscious agent in advancing or retarding that process.

MORALITY IS PERSONAL

We thus come into sight of yet deeper issues which will secure due attention when we treat of personality. A few preliminary observations will clear the way.

It is unnecessary to point out that when I claim for moral choice a place in the cosmic process, I am not thinking of causation of the physical type; the chapter on Causation will have guarded me against such a misinterpretation of my contention. I adhere, indeed, to the idea of causation, and repudiate the ideas of caprice and indeterminism—but I posit a higher type of causation, quite beyond the range of physical inquiry, that of self-determination. The fundamental concept here is that of individuality rising into self-conscious personality.

A moral agent is developed in and through a process which is transfused and guided by moral principles. Individual centres of the will-to-live, when they have reached the stage of self-consciousness, arrive at moral judgments by reflection on principles and ideals which "naturally" provide material for such judgments, and which find new applications in each new situation that calls for moral action. There is here provided a cosmic basis for the evolution of conscience; and for those of my readers who can follow me in this, the inference from the moral element in experience to the moral element in the Ground of Being is deepened and strengthened. But in any case, there are the facts of the moral life, and the inference is as safe as it is necessary.

CHAPTER II

INDIVIDUALITY AND CREATION

We have seen that self-feeling (simple consciousness) is a fact of direct experience, and that we are therefore driven to seek for its adequate Ground in the Being Who is the Source of the process. We now proceed to consider a higher grade of experience, that of self-consciousness. It involves self-feeling, but goes far beyond it; for it implies the existence of a conscious centre that is conscious of itself as an individual, in distinction from, and in opposition to, all that is not itself.

We naturally at once ask for some definition of the Self; and so we might plunge into the stream of controversy that swings and swirls around this elusive entity. Let us avoid, as far as we can, the metaphysical issues, and keep to the plain teaching of actual experience.

Let us hold what views we will as to the nature of the Self, this much cannot be denied—we have come to use the term, and we believe it to have a meaning. Whence did we derive it? What are the implications of the bare fact that we possess it and can argue about it?

SUBJECT AND OBJECT

The idea of the Self, like all our other ideas, has a history, and so also has the group of psychical facts which it seeks to denote. At its base is the opposition between the subjective and the objective factors in our experience—an opposition which science ignores, but which is fundamental for all thinking, primitive or advanced. A self-conscious individual can set himself

over against the universe ; over against his Source ; nay, over against himself. Even the Solipsist, who would bring the universe within his own centre, cannot avoid presenting one part of himself to another part, or he could not think at all. The Solipsist position is extreme to the point of absurdity (and is yet so hard to refute !), but for this very reason is valuable as showing that the subject-object relation cannot be transcended.

We have here, then, a distinction, an opposition which may be taken as ultimate, and which must be given due prominence in our cosmology. We shall find that it takes us a very long way towards understanding the higher aspects of our problem.

The first question I would seek to answer concerning it is this : Has it been evolved ? I think it is obvious that we must answer in the negative. As an element in our consciousness the evidence of its empirical development in clearness and force is plain and abundant. But the opposition itself is one which is increasingly recognized, not one which, as such, is subject to a process of Becoming—any more than are the properties of space.

I have contended that matter is not only a basis on which subsequent stages of evolution are constructed, but that by establishing antagonisms to centres of will, it provokes efforts which are a condition of progress. An advanced result of the putting forth of effort is the consciousness gained by the centre that effort is called for. By the accumulation and co-ordination of these and the like experiences there come into existence organisms which advance in degrees of conscious individuality, and which have culminated in the Becoming of fully self-conscious Persons.

Self-consciousness has, I say, its degrees. A savage has but a meagre stock of experience as compared with that of a highly civilized man, and his apprehension of his Selfhood is proportionately small. We may reason-

ably infer that stocks of experience less than that of the savage produce smaller degrees of self-consciousness, and that larger stocks than those of the civilized man produce greater degrees of self-consciousness. We thus infer that there is a scale which descends below the human on the one hand, and on the other rises above it in the case of beings who are superior to him. That is to say, we may consider that the individual becomes an individual in proportion to the material he possesses for realizing the distinction between subject and object.

Two important corollaries present themselves. First, it appears that we do not owe our sense of Selfhood to the abstract reason, but to the interactions of our conscious centres with each other and with their environment. And secondly, the Self is only a Self because it is in vital union with its Not-Self. In other words, we are only able to distinguish ourselves from our world because we are continuous with it. Two facts so significant for the higher stages of the evolutionary process must have definite recognition in any adequate cosmology. Let us analyse them a little more fully and follow the lead they so imperatively offer.

INDIVIDUATION

Certain philosophers have been so keen to emphasize the essential unity of all existence that they have striven to resolve single concrete phenomena into pure relations. In so resolving them they have dissolved them. For, after all, relations, as such, cannot give us the Real. Relations must imply some things that are related. We may, and must, grant that there are no isolated phenomena ; but we must hold fast to our belief in the existence of events and things which stand out with varying degrees of individuation.

Tyndall, in view of the summit of the Matterhorn, reflected on its pre-existence in the promise and potency

of matter. The summit which stimulated his thought is part of a mountain—the mountain is part of the Alps, and these, again, of the globe—and so on until we come to the universe. But the summit has nevertheless a certain place of its own, and constitutes a definite phenomenon in the continuous panorama. Still more is this true of Tyndall's meditation. It was continuous with the whole of the thinker's mental life, an outcome of his education and special line of study ; and it took its place as a factor in his subsequent mental life : and all this, again, shades off into the mental life of the race. But the meditation was nevertheless a definite event at a definite time in a definite place. Most of all is this true of Tyndall's Self, his personality. You may enlarge as you will on the hereditary factors in his being, and link him on to the race at large in a million ways ; none the less, Tyndall was Tyndall. You cannot describe him by uttering a mystic "Thou art it," or by dissolving him into a relationless Absolute. He was a conscious thinking centre with very definite views on certain subjects, with a place of his own in the history of science, practical and theoretical, and with a temperament of pronounced individuality.

Individuation, instead of being an exception in nature, is the universal rule. It is a commonplace to say that no two leaves of the forest are alike. In the chapter on Matter I affirmed this to be true (*pace* the chemists) of atoms and electrons. No two are alike, and none remain unchanged. Personality is but the highest manifestation of a universal principle.

It is not difficult to trace the upward trend in distinctness of individuation. Low down in the scale we have the chemical elements as differentiations in ether which have attained forms of great stability. In the next stage, that of crystallization, the forms become more complex and symmetrical. In the cell we have yet more

complex structure and richer individual potentialities, admitting of differentiations into tissues, muscles, nerves, and the rest. And so on through the successive stages of organic development—there is steady gain, not only in complexity, but in degree of individuation. And we arrive duly at the philosopher who, as an individual, can set himself over against all else that exists, or even imagine that all that exists is himself. We are here in the realm, not of theory, but of observable facts.

NATURE FAVOURS INDIVIDUATION

In this connexion it is extremely noteworthy that there is not merely a tendency to individuation in the individuated centres themselves, but a tendency in the environment to favour such individuation. Tennyson wondered that Nature should be " so careful of the type " and so careless of the individual ; but as the process advances this is decreasingly true. In the case of the lower organisms there is often an astounding production of germs, as in the case of many plants, of fish, and of insects. But as we rise in the scale, the number of offspring is, broadly speaking, steadily reduced, and Nature trusts rather to a careful selection of the few than to a promiscuous selection from multitudes.

This tendency to individuation is manifested, in the case of the higher organisms, by a prolongation of life beyond the age of reproduction ; the individual begins to have a value on his own account. Hence Tennyson's lament, that Nature, while " so careful of the type " is careless of the individual, is less true as the process advances. There are not a few signs that, instead of the individual existing for the species, the species is coming to exist for the sake of the individual. Nature was not careless of Tennyson. She nurtured his poetic genius and loaded him with fame and honour. In brief, we

have accumulating evidence that Nature has in view the evolution of Persons.

THE TENDENCY TO SOCIALIZATION

I have laid stress on the individualizing tendency. We must not, however, lose sight of a concurrent tendency to make the individual more and more complexly dependent on his social environment. This socializing trend seems to be, at first sight, contradictory of individuation; but on deeper reflection it is seen to be the most potent of all means for its realization. The truth is, of course, that, since self-consciousness is dependent on experience, the richer and fuller the experience the more vivid the consciousness. And the richest and fullest of all experience is that gained through the intercourse of Persons.

The individual gains his ends and realizes himself in proportion as he is in right relations to his universe in general, and his fellows in particular. And this is tantamount to saying that we must guard against a false individualism. The goal of the Process is the development of Persons; but it can only be reached in and through social relations. Perfect Personality implies living in perfect harmony with a perfect society.

Here we have the true place and function of that altruistic factor in evolution to which I have drawn special attention in an earlier chapter. In these higher manifestations of its working we realize that it is not a passing, but a persistent factor, and that its value grows as individualization increases. The more advanced a civilization the greater the variety and effectiveness of the individuals it produces. On the other hand, the greater the variety and effectiveness of the individuals, the richer and fuller is the social environment. There is action and reaction to the end. Thus the saying that there is no man whose place cannot be filled loses its

force in proportion as social bonds become more manifold and intimate, and as individuals gain in special attainments and in definiteness of character.

ORIGIN OF INDIVIDUALS

And now comes a question of paramount import for our cosmology. I have hitherto spoken, without definition or explanation, of centres of the will-to-live. The time has come to determine, as best we may, their relation to the cosmic process. As I am keeping, where possible, to the sphere of phenomenal existence, I shall not attempt to deal with the creation of beings like angels and other denizens of the spiritual sphere. That man is the highest product of creative activity is hopelessly improbable; but he is the highest product of evolution as known to us. It is of him, then, and the ranks of being below him, and in known developmental connexion with him that I am here directly concerned. Of the centres empirically known to us we may ask: Are we to regard them as existing prior to the evolutionary process?—or as created from time to time in the course of that process?—or as themselves products of that process?

I do not say that these three questions exhaust the possibilities, but they are those which have come to the front in controversy; and they cover the ground sufficiently for our purpose. Further, the conclusions at which I arrive are tentative. My main line of argument is unaffected whichever theory we may individually favour. For as a matter of fact the centres exist, and are what they are, and must be accounted for as existing.

CREATIONISM AND TRADUCIANISM

The problems thus raised arouse echoes of an old controversy which never reached any definite conclusion —I refer to the contention between the Creationists and the Traducianists. The issue really turned on attempts

to account for Original Sin. Both parties agreed that the effects of the Fall were inherited. But how? The difficulty could not be satisfactorily settled by the naïve theory that God first creates a body and then puts a soul into it. It was also seen that sin, being a spiritual thing, evidently concerned the soul rather than the body. The question thus assumed the form—What is the origin of the soul? The Creationists maintained that God separately created each soul as it appeared, and they imagined it to be infused into the fœtus so as to fertilize it. The Traducianists decided that the soul, as well as the body, is propagated in generation, and that God's creative activity ended on the sixth day. The creation of the soul was thus regarded by them as a racial, not an individual act.

If we keep to the old premisses, the dilemma is indeed formidable. Does it become more manageable if we adopt the modern evolutionary point of view? The main difficulty, now as of old, is the factor of heredity; and we are still asking how this can be reconciled with the existence of true individuals.

CONSCIOUS CENTRES AS EVOLVED

Putting aside all prejudices and preconceptions, let us examine the evidence on its merits and in the light of modern knowledge. And let us first ask what is involved in maintaining a purely evolutionary theory of the origin of individual centres of the will-to-live.

In favour of this theory we have the principle of continuity—a principle on which I have frequently insisted. If we hold to the physical nature of heat, light, electricity, and the rest, the supposition of their evolving conscious centres is absurd. But I have shown reason for holding these forms of force as being fundamentally psychical or spiritual, and the objection so far fails—spirit can quite conceivably evolve spirit. In an egg, for instance, there

is a concurrence of certain forces which lead to the formation of nerves, muscles, glands, tissues, organs, and the rest which are in such relation to each other as to issue in the individual chick. We seem to have here nothing but a continuous process from the non-individuated condition of certain forces to their complete individuation. But there are serious objections to such an inference.

The chick is not a mere concurrence of motions and sensations—it is also a centre of conscious will. This implies a core in its being which relates to itself the flux of experience. Whence this unifying or centralizing core? If objection is taken to endowing a chick with conscious will (though such objection seems to me absurd), I substitute for the egg which produces a chick an embryo which produces a man. And my question then rests on data derived from experience at first hand.

It is now generally agreed that a Self cannot be, as Hume said, a mere bundle or collection of different perceptions. Self-consciousness cannot at all be resolved into any kind of mere series, or into " atomistic states." The various perceptions, or states, are not separate entities, but aspects, or changes, in a *continuum*. Hence my use of the term centres of " the will-to-live." Not that " will-to-live " completes the description of an individual; but it serves to emphasize the essential feature now before us—the unifying activity which we immediately know as a fact of conscious life. It also links on these higher aspects to the Darwinian's central principle, the " struggle for life "—not to mention its adoption by Schopenhauer as the mainspring of his suggestive speculations.

A PHYSICAL ANALOGY

Is there any physical analogy on which we can lean in trying to conceive of the existence and persistence of such

definite centres ? I think so. Lord Kelvin told us that in a perfect fluid, any whirl or vortex once established would be indestructible. May we not give this statement a psychical or spiritual application ? If consciousness is the ultimate substance of the universe, there may be whirls or vortices (so to speak) which establish in it indestructible centres of consciousness ; and these, while remaining continuous with the universal substance, would yet possess a relatively independent being.

Such a theory seems best to accord with the facts of conscious life as they come to us in the development of our own centres—it affords a basis for the unity in diversity which characterizes that development. I therefore postulate an indefinite number of such centres —indestructible cores which, while having a certain separateness, are in living connexion with the rest of existence, and which realize their potentialities by absorbing into themselves more and more of the life and meaning of the Whole. The process is psychical, or spiritual, and thus transcends physical categories. But it is real, for we know that human embryos do develop into Persons.

CHAPTER III

A MODIFIED PLURALISM

Inclining, then, as I do, on grounds just stated, to a theory of special creation for individual centres of the will-to-live, I would advocate a kind of modified Pluralism. We know, as a fact, that there are in existence an indefinite number of these centres in all stages of development. I hold that these are dowered in varying measure and degree with a real though limited spontaneity, by virtue of which they can exercise a certain influence on the world-process. But I also hold that they are only secondarily independent—that they owe their existence as centres to an act of creative will. Like the properties of space, they are independent of the categories of development so far as their origin is concerned. But, unlike the properties of space, they are possessed of undeveloped potentialities which, to be actualized, must be subjected to the conditions manifested in the evolutionary process.

In respect of origin, therefore, the theory is in harmony with the doctrine of the Creationists rather than with that of the Traducianists. For the existence of those centres constitutes a limit to the principle of continuity —a limit to be added to the number of those already discussed (Part II, chap. iv). Once immersed, however, in the flux, they attain to self-realization in accordance with that principle.

Such a speculation might thus be called, by a clumsy but convenient summary-term, a Creationist-Evolutionist Monadology. At the head of existence is the Supreme Monad—God. Around Him, in various orders,

and in various stages of development, are an indefinite number of derived, or created, monads, sharing in various degrees God's spiritual freedom and spontaneous initiative. These created monads are in vital and continuous communion with one another by virtue of the continuity of their being with that of the Supreme Monad. Hence, through the interaction of their wills, the evolutionary process as we know it; hence, through the organic unity resulting, the interposition of hereditary factors in the development of individuals; and hence also, through the clashing of unharmonized wills, the pain, the sorrow, and the sin of the world. By being plunged into the stream of the cosmic process (produced by the concurring developments of innumerable wills) the monads have a field for the putting forth of effort—the means of their self-realization. The goal of the process is the development of Persons whose wills are harmonized, and who find fullness of life in, and for, and through their membership of a perfect Society.

WALLACE'S RESERVATIONS

Apart from the creation of the monads, I make no reservations to the sway of evolution. Alfred Russell Wallace, a co-founder with Darwin of the epoch-making hypothesis, was disposed to allow to certain human faculties a special origin, more particularly the capacities for mathematics, music, art, and morals. In arriving at this conclusion he was perhaps to some extent under the influence of the movement known as Spiritualism; but he ostensibly based them on the difficulty he had in showing that those faculties could have been evolved in the struggle for life—he could not discover sufficient Darwinian grounds for their development.

But in this I conceive he took too narrow a view of the nature of the evolutionary process. He held it to be wholly due to fitness to survive in the universal struggle;

whereas I have contended that such survival-value is but one factor in a vastly complex system. There are rational, æsthetic, and moral elements no less plainly, if hitherto less dominantly, manifested. And thus the excepted faculties, though perhaps but slightly due to "struggle," may be (as Fiske suggests) the result of the direct action of the environment on the organism. Or, to put it from the point of view of a Creationist Monadology, these faculties were potentialities which are being actualized by the interactions of the monads. In the case of conscience, for instance, I have given reasons for believing it to be the outcome of the relation of will to will—that is, to be social through and through. If there are centres of the will-to-live which have not learnt to live in harmony, but which are destined to be harmonized, ethical codes as the expressions of developing moral sense are bound to appear. The mathematical faculty may be held to be developed in response to the properties of space and number; that of art in response to the principle of Beauty which works in and through the process.

I therefore conclude that Wallace's partial abandoning of the evolutionary doctrine was hasty and premature, and argued a failure to grasp the larger aspects of the theory which he did so much to establish. On the other hand, I maintain that the unity revealed in the experience of a conscious centre constitutes, by its very nature, a limitation to the principle of evolutionary continuity.

PERSONALITY ESSENTIAL TO THE PROCESS

It would seem to be possible to take a further step in speculating as to the goal of the process. We have good grounds, as we have seen, for supposing that its purpose is the evolution of Persons. Could it be anything else? The question may appear to be hardy, or even presumptuous. But if a creation is to be real, it must (as

Lotze argues) have " a realization other than that which it already has in the divine mind." And what is this but to say that it must have an existence in other minds which can participate in, and so externalize, the cosmic thoughts of the Creator? And what is this, again, but to say that there must come into existence individual minds which can think the thoughts of the Creator and make them their own?

It is on these lines that Lotze arrives at the following definition of Creation: " God permitted the thought which was at first only His own to become the thought of other spirits; or He caused this world of spirits to arise in which His continual influence and operation causes His own cosmic thoughts to arise and figure as the appearance of an outer world surrounding them and capable of being perceived by them." *

THE GOAL AND THE INCARNATION

When we would take stock of the total facts for which a cosmology should find a Ground, it is impossible (if we are in earnest) to pass over the unique and ideal manifestation presented by the Personality of Him Whom St. John calls, " God manifest in the flesh." Our primary concern, as cosmologists, is with those phenomena in the Cosmos which are matter of direct experience, and with their implications; we may therefore pass lightly over the controversies raised by the theological aspects of the Incarnation. But we cannot pass over the fact that on the stage of history there emerged this unique Life, so distinct in its individuality, so full, so potent, that multitudes have deemed it, and multitudes still deem it, to have been the salvation of the race? I have often affirmed that a process must be judged by its highest manifestation. Here is the highest manifestation of the cosmic process. Our problems,

* See under " Creation " in his " Philosophy of Religion."

therefore, here reach their climax, and are presented in their most concentrated form. A deep thinker of wide sympathies has written thus: "When God and everything that is sacred threaten to disappear; when the mighty forces of inexorable nature seem to overwhelm us, and the bounds of good and evil to dissolve; when, weak and weary, we despair of finding God in all this dismal world—it is then that the personality of Christ may save us." This is couched in somewhat pessimistic terms; but its substantial truth is incontestable.

A cosmology, then, which pretends to deal with the facts in their entirety and yet fails to take cognizance of this unique Person is hopelessly discredited. For the highest and most significant fact of all will be unassimilated and unaccounted for, and the key to the deepest problems will be left unturned.

Let us note, in the first place, that this unique Person entered into the full stream of the cosmic process. He was born of a human parent, and, in vital connexion with the physical as well as the psychical, "grew in wisdom and in stature." That is to say, He had a normal development. He knew what suffering was, and was "made perfect" through the experience. If it is objected that He was not conscious of sin, the answer is simple. He was tempted—He experienced the struggle between the lower and the higher elements of our nature; but He triumphed; the lower never gained the victory. He thus proved for us that the actual experience of sin is not a necessary stage in the passage from innocence to virtue—the potentiality of sin suffices as the outcome of freedom of moral choice.

THE INCARNATION AS A KEY

If, then, we can in any measure pierce down to the depths of this unique Personality, we shall gain a glimpse of the essential tendency of evolution, and of the intimate

nature of its Ground. And He Himself revealed to us His secret. He rose through the physical to the spiritual, and was immediately conscious of their living, unbroken relationship. In the crystal purity and limpid depths of His soul, earth and heaven were indissolubly united. Under the rich symbolism of the Creator as a Father He affirmed the true relationship of individual centres to their Source and Ground. For Him, the world was no longer, as for Plato, a prison-house of souls, but a sphere for the development of our noblest powers and for the realization of our divinest potentialities. He conceived the end and aim of our development to be full and perfect Sonship.

THE LOGOS AND CREATION

I have spoken of the Personality of Jesus Christ—that is to say, of that side of His Being which was manifested under the conditions of a human life. But as I have several times pointed out, the Church from the earliest times has brought that Personality, traced back to its Divinity, into special connexion with Creation. There is a striking passage in the Epistle to the Colossians which goes directly to the essential doctrine. God's purpose is there presented as being long hidden, but at length revealed in Jesus Christ. The mystery and the motive of the drama of time is declared to be this—to gather up all things under one head in Christ. " For in Him were all things created, things in the heavens and things upon the earth ; things visible and things invisible ; all things have been created through Him and unto Him ; and He is before all things, and in Him all things have their foundation " (Col. i. 16).

The claim here advanced is tremendous—when we realize its cosmic scope, it is even staggering. It is not matter for astonishment that there are orthodox commentators who have held that it should be limited to the

new creation, the spiritual world. But the Logos doctrine and the evolutionary theory combine to help us. Science will not allow us to split up existence and put the separated portions into water-tight compartments; it insists on the continuity and unity of the whole process. The Logos doctrine may be called the spiritual correlative of the conclusions of science. It asserts the continuity and unity of the Divine Creative activity.

Did matter contain from eternity the promise and potency of our Universe? Then we may say that likewise, rising to the highest plane of existence, we may regard Jesus Christ as the peak of the cosmic process, and see in Him the promise and potency of that Kingdom of Persons to which the whole creation moves. He is thus seen to be, not only the Ideal Man, but God turned manward. As life came to the birth in the cell; as consciousness came to the birth in the mind of man; so did the ultimate spirit of the world come to the birth, so far as our cosmic process is concerned, in Jesus Christ, the Incarnate Logos. As the Logos He was immanent in the process from the beginning, the Divine Creative Power, in, by, and for Whom all things consist. And He it is Who is ever working to reduce to order and harmony the unruly and undisciplined wills that are ultimately to be welded by Him into a spiritual unity.

If it is asked why the Logos should become Incarnate as the Ideal Man, during the process, and not at its end, it is possible to give as answer that is in accordance with the purpose of creation as above defined. If we limit ourselves to the stage of physical development, such an anticipation would be out of line with the laws that govern that development. But when man has once attained to Selfhood, he comes under the sway of the Ideal. That is to say, he is not pushed from behind by physico-chemical forces, but drawn onwards by the pull of the Ideal from the front. The Incarnation may be

thus viewed as the bringing of the spiritual Ideal into actual contact (so to speak) with the order which, comparatively speaking, may be called " natural." It supervened at the stage when the new attractive power could exercise its reconciling function in the spiritually expanding world-process. Henceforth the At-one-ment which is being effected by the Logos exercises its transforming power on centres which have developed to the point of consciously realizing their destiny as Sons of God.

TWO CONCLUSIONS

An acceptance of the principles laid down in this chapter enables us to draw two conclusions which are of supreme import for our cosmology.

In the first place, we have reached a definition of the end or purpose of the cosmic process—the evolution of Persons who are to find fullness of life in and through membership of a perfect society.

In the second place, applying in this last stage of our inquiry the principle with which we set out—*ex nihilo nihil fit*—consistency compels us to conceive the Source or Ground of the evolution to be Himself a Person. I do not wish to imply that Personality in God is the same in all respects as in ourselves. We are only Persons-in-the-making; moreover we are limited in countless modes which will not apply to the Divine Nature. But this much we can affirm on the basis of experience which is actually ours, that to be a Person is to be at least a centre of consciousness with a power of spontaneous self-determination. And this suffices to give our cosmology a rational basis; it suffices to make life worth living. The grounds for the conclusion are obtained from our knowledge of the cosmic process itself; and they are confirmed by the Ideal Person Who appeared among us —" He that hath seen Me hath seen the Father."

CHAPTER IV

GOD A PERSONAL CREATOR

Of his three famous stages—the theological, the metaphysical, and the positive—Comte held that the first two had missed the mark, in that they had attempted to arrive at definite concepts of the Power or Cause behind phenomena. That Power or Cause, he maintained, is and must be an Unknown. He bade us therefore acknowledge the finality of the third stage, the positive, which ignores the existence of the Unknown and restricts itself to the sphere of observable facts. His cardinal error, as argued in the chapter on Causation, was this—he conceived these stages to be successive; whereas they are continuously contemporaneous throughout their history. Moreover, the goal of each is one and the same, the apprehension of unity in the manifold of experience.

Theology has struggled through Polytheism to Theism; that is, to the conception of one Supreme Being. Metaphysics has struggled through various confused and incoherent systems to a conception of the unity of Nature. And now Science has struggled through discoveries of apparently heterogeneous elements and forces to a unifying concept of Energy—a mode of active Being of which all the rest are manifestations.

THE UNITY OF THE COSMOS IMPLIES UNITY OF SOURCE

It is plain, then, that all branches of human inquiry and research tend alike to a recognition of a principle of unity in the Cosmos. And this fact makes it easy and

natural to bring to a focus the conclusions which have accumulated in arguing from the facts of experience to the existence and the nature of an adequate Ground.

Our Cosmos manifests the unity of a continuously developing plan, and as various thinkers, scientific as well as philosophical, have confessed, almost irresistibly suggests the working out of a definite idea. Our world is in the making, with a goal which may be dimly apprehended, but which is still out of sight. It continues on its course in sublime independence of man's wishes or activities, with pace slow, majestic, sure. As Matthew Arnold has finely put it in his apostrophe to Nature :

Still do thy sleepless ministers move on
Their glorious toil in silence perfecting—

a toil that is

Too great for haste, too high for rivalry.

This process, wherever we can discover its methods and principles, proves itself to be akin to our intelligence. Hence the possibility of science and a philosophy of nature. Again it is not only in correspondence with (or rather educative of) our reason, but it " makes for righteousness "—it is inherently moral because it has evolved moral agents. In short, we have a Cosmos displaying unity, intelligent purpose, and moral guidance. We are therefore bound to postulate a Ground that shall be equal to producing such results. *Ex nihilo nihil.* The Power behind must possess unity, reason, and moral purpose. Add the fact that moral purpose can only be possible where there is personality, and we have the creating Power Whom the Theist calls God.

" Every step in advance," says Herbert Spencer, " has been a step towards both the natural and the supernatural. . . . And so there arise two antithetical states of mind, answering to the opposite sides of that existence

about which we think. While our consciousness of Nature under the one aspect constitutes Science, our consciousness of it under the other aspect of it constitutes Religion." *

It is somewhat baffling to understand why Herbert Spencer, having gone as far as this, should have concluded that the Power behind is an Unknown. Why shatter the unity discovered? In so far as we really know the world, we know God.

THE UNKNOWABLE

Let us follow up a little more closely this doctrine of the Unknowable. None will be so foolish as to imagine that we can ever have so clear and defined a knowledge of God as to feel we have comprehended Him. We may also allow that theologies, ancient and modern, have erred in demanding assent to what are mere constructions of human speculative and dogmatic attempts to define the undefinable. We are entering on an era of what is at once a more unshackled and a more reverent treatment of ultimates. Our scientific knowledge of the Cosmos, our expanding ideals and hopes, as they become more complex and comprehensive, compel us to revise our traditional ideas of the Divine Nature and of the modes in which God works. But this is not to fall back on a doctrine of total nescience! The universe being a manifestation of the Power behind—a product of His working—must stand in some real relation to its Author, and be, so far at any rate, a revelation of His nature and His purpose.

Even Herbert Spencer affirms of his Unknown that it exists. This is something—it breaks in on a total nescience. But can we stop here? To assert that a thing exists implies some ground for the assertion—a thing known must in some way be in real relation to the

* "First Principles," p. 105.

knower. Bare existence would be unrelated existence, and therefore equivalent, so far as knowledge is concerned, to non-existence. Consider from this point of view the following passage from the same author: "Though the Absolute cannot in any manner or degree be known in the strict sense of knowing, yet we find that its positive existence is a necessary doctrine of consciousness; so long as consciousness continues, we cannot for an instant rid it of this datum; and that thus the belief which this datum constitutes has a higher warrant than any other whatever." *

"A higher warrant than any other whatever"!—and yet it cannot be known! How psychologically interesting is this endeavour to mingle positive science and Mansel's Absolutist Metaphysics! The ingredients, however, are too obviously incompatible; and there are few who can profess adherence to this honest but vain effort to compound them. Positivism I know, and reject. Absolutism I know, and reject. The former limits our knowledge to phenomena: the latter abjures experience to expatiate in the relationless abstractions of the Unconditioned. A mixture of the two involves all that is questionable in both without securing a shadow of compensation.

Why forsake the solid ground we have when we refer to our own central experience of life as we live it? We know that in human affairs, where we see evidence of intelligent action we infer the activity of intelligent agents. Impersonal purpose is a monstrosity, like a four-angled triangle. It is man himself who furnishes the key to the Power behind the process; his part in that process shrinks to infinitesimal proportions when we survey the whole—but it is real as far as it goes, and adumbrates for us the complete Reality. We are on safe ground when we keep to the grand generalization of unity, and,

* "First Principles," p. 98.

including in that unity the highest manifestations and developments of our own nature, refer the whole to one supreme Intelligence, spiritual, personal, everywhere and always active. To this extent, at least, we must be anthropomorphic if we would deal with the facts in their entirety on the basis of our actual experience. If we forsake this clue because logical demonstration is lacking, nothing remains but to yield ourselves to an irrational agnosticism. I do not hesitate to call it "irrational," because it refuses the only guidance that experience interpreted by reason can afford.

I grant that an act of faith is called for. But I would rather that my act of faith should be founded on the deepest facts of my own conscious existence than on abstract and ever-changing formulæ which only tell of fortuitous heavings of a purposeless Energy.

PERSONALITY OF GOD

In arguing that because the cosmic process has produced Persons, the Ground of that process must be a Person, I have recognized the danger of undue anthropomorphism. Let us face this difficulty a little more definitely.

It is certain that we cannot be wholly anthropomorphic. Think of the enormous gap between the individuality of an atom and the personality of a Shakespeare. How can we refuse to suppose a gap indefinitely greater between man's personality and that of God? But to be fully alive to the existence of this gap does not at all weaken the significance of the facts which are within our range. However much the Divine Nature may transcend the scope of our faculties, we can infer that it must at least include that which we understand by personality. We may take refuge in such terms as ultrapersonal: we may deny all limitations in the Divine: we may, if we like, soar to an unconditioned Absolute: nevertheless

here are the facts of our experience which demand their adequate Ground. If we in our tiny spheres of activity are conscious of individual initiative and moral purpose, we cannot, consistently with loyalty to *ex nihilo nihil*, refuse to carry up our concepts of these into our all-embracing Concept. Unless God were Himself capable of our modes of experience, He would not be the Ground of them.

THE ABSOLUTE

If it is objected that we are thus limiting God's Nature, I am not much troubled. Can it be deemed that existence, as we know it, involves limitations ? Whence do they come ? We say God has limited Himself in His creation. If such a mode of expressing the facts brings philosophical or other comfort to any one, there is not much harm done if thereby it is not intended that, apart from His creation, God is limitless. Nowhere in the Cosmos is there a trace of the limitless—neither in the physical sphere nor in that of thought. All modes of existence are related to each other and limit each other. If it is urged that Time and Space are infinite, I answer that they can only be known to us because there are definite times and places—points from which reckonings can be made. We may even contend with reason that space and time exist only in so far as they contain, or express, relations. As for an Unconditioned, or an Absolute, I hold such concepts to be the veriest nothings. How could a genuinely unconditioned Being come to limit Himself ? The fact of creation involves a reason for creation—that is to say, a condition or relation in the Being Who creates. If there is a false Positivism, there is also a true.

To appeal to the limitations of our reason, or to acknowledge " mystery," is indeed sometimes inevitable. But we need not manufacture difficulties by indulging

in flights of unverifiable abstraction. Let us recall Anselm's simple yet profound teaching, that God's creative activity is coeval with His Being; or that of Aquinas, that a cause must always produces its effect. These philosophical views, based on actual experience, will give weight to the reflection that for those who hold that God's innermost nature is Love, God must not only be a Person, but must have objects of His love. Christian theologians have recognized this aspect of the problem by affirming that the differentiation of Persons in the Trinity secures satisfaction of this desire. Since the Son is the Logos, we have but to extend this doctrine to find a ground for the Universe.

THE FACT OF LOVE

Love! The mention of this brings us to the heart of the matter. If there is one fact of human experience that stands out with unmistakable clearness it is this—that the higher we mount in the scale of being, the more distinct are the capacity and the craving for love. The function of its lower manifestations is splendidly described by Lucretius in the opening of his great cosmological poem. The passage is filled with emotional appreciation of the rôle played by this particular manifestation of feeling; and it is strange that a poet who could advance so far in the personification of it should have then so completely depersonalized it as to resolve it into a blind product of clashing atoms! Plato had attained to a truer vision, and traced the emotion up through its varied stages to its highest forms, though even he did not grasp its full significance as being ultimately rooted in personality.

Dr. M'Taggart is one of our leading Hegelians who has brilliantly striven to give content to the Absolute. A passage from his "Studies in Hegelian Cosmology" admirably expounds the correlation of love and per-

sonality. "Perfected knowledge and volition, taken in connexion with the consequent feeling, not only produce personal love, but, as it seems to me, produce nothing else. There are, it is true, many other ways in which knowledge and volition produce pleasure. There are the pleasures of learning, of the contemplation of scientific truth; there are the pleasures of action, of virtue, of gratified desire. But all these depend on the imperfect stages of development in which knowledge and volition are occupied with comparatively abstract generalities. Now all general laws are abstractions from, and therefore distortions of, the concrete reality, which is the abstract realized in the particular. When we fail to detect the abstract in the particular, then no doubt the abstract has a value of its own—is as high or higher than the mere particular. But when we see the real individual, in whom the abstract and the particular are joined, we lose all interest in the abstract as such. Why should we put up with the inadequate falsehood when we can get the adequate truth? And feeling towards an individual who is perfectly known has only one form" (love). A little later, he writes: "I have endeavoured to prove that all perfect life would lead up to and culminate in love. I want now to go further, and to assert that, as life becomes perfect, all other elements would actually die away—that knowledge and volition would disappear, swallowed up in a higher reality, and that love would reveal itself, not only as the highest thing, but as the only thing in the universe."

Those who have studied Dr. M'Taggart's writings will know that the keen incisiveness of his dialectic frequently leads him to startling negations of our ordinary beliefs. They will thus be able to appraise rightly the value of his conclusions in regard to love as a relation between individuals. It is the more striking because he has decided to deny personality to his Absolute, which he

conceives to be the totality of individuals. Here I cannot follow him. In studying his deeply suggestive speculations, I am always wondering why he retains the term " Absolute " at all ; for it seems to me that even on his own premisses, the relations between individuals are contradictory of the unrelatedness—the unconditionedness—which that term implies. But passing over this as merely proof of his loyalty to Hegel's terminology, I would urge that the individualities which constitute his Absolute must have their Ground in that Absolute, and that the Ground of the Whole cannot be denied that which is the hall-mark of its parts. Do we not gain a richer concept if we hold that the individuality of the parts finds its bond of unity and its highest expression in the individuality of the all-embracing Being ? The inner meaning and value of existence can then be defined in terms of love throughout. The Creator creates in order that He may have objects of His love—those objects being necessarily themselves capable of love, and so of being united in a spiritual whole.

Those of us who hold to this Theistic world-view must be prepared to interpret all the products of creative activity in accordance with the guiding principle it involves. The goal of science, no less than that of philosophy and religion, must be the consciousness of, and loyalty to, the motive power of love in every part of the Cosmos. Not alone ethics, art, and theology, not alone the drama of history, but the mechanism of the universe must be regarded as the means to achieving the purposes of love. Our outlook is still too narrow, our horizons are still too contracted, to permit of our carrying out this task with anything like completeness. Moreover, we are at present still too much hampered by the disproportionate bulk of scientific data to get things into right perspective. These scientific facts are too far removed from the living reality to be readily fitted into

their places in the larger cosmology. But we need not be unduly solicitous on this score. For the promptings and intuitions of the heart will ever, if we give them fair play, restore the balance disturbed by the undue, but passing, preponderance of the products of the abstracting intellect. The true reality, as Lotze says, " which is, and ought to be, is not matter and is still less Idea, but is the living personal God and the world of personal spirits which He has created."

Our knowledge is sadly imperfect. But it suffices to hold out promise of the discovery of new harmonies where our faculties still fail to catch them, and where apparent discords still call for resolution.

CHAPTER V

RELIGION

Like all other great outstanding facts of experience, religion gains indefinitely by criticism and research. So long as the critical apparatus was lamentably deficient, its advocates and its opponents alike took up many indefensible positions. Unfortunately they agreed in this, at any rate, that religion should be regarded as something outside the natural order, as though it were a meteorite coming to us from some world which has no organic connexion with our own. The mistake on the part of certain theologians is capable of rational explanation. But how shall we account for the wholly hostile attitude assumed by certain evolutionary thinkers? It is another instance of their curious inconsistency in trying to account for man as a product of the evolutionary process, and yet trying to exclude from that process nearly all that is distinctively human.

UNIVERSALITY OF RELIGION

What are the facts? We find that belief in a superhuman being, or beings, with an accompanying feeling of dependence, is practically universal among men. It was for a long time contended that there are certain peoples or tribes which do not possess this belief. Even were this the case, it would have but little significance if regarded in the light of the principle of evolution; it would merely be a question of determining at what stage an implicit factor in the process became explicit. The argument, therefore, would be of *ad hominem* character as against certain dogmatists: it would not affect the

significance of the facts that the phenomenon is practically universal, that it is persistent, and that it bulks with portentous magnitude in the history of humanity.

But it is not even true that there is any people or tribe that does not possess some sort of religious ideas. As Tylor says: "Though the theoretical niche is ready and convenient, the actual statue to fill it is not forthcoming. The case is in some degree similar to that of the tribes asserted to exist without language or without the use of fire; nothing in the nature of things seems to forbid the possibility of such existence, but as a matter of fact the tribes are not found." * And Tiele, one of the highest authorities on the subject, says: "The statement that there are nations or tribes which possess no religion rests either on inaccurate observation or on a confusion of ideas."

We may take it for granted, then, that religion, in the sense of belief in, and dependence upon, a superhuman being, or beings, is a universal fact, and as such it demands definite recognition in our cosmology. But this does not imply the existence of a primitive or universal religion. The critical and historical study of religions has made it impossible to maintain a thesis which had great vogue in days when the data were insufficient, and when strong preconceptions rendered calm reasoning almost impossible.

EVOLUTION OF RELIGIOUS IDEAS

There are few nowadays who would champion the doctrine that the idea of God, as held by representative thinkers of the highest types of religion, was that which originally everywhere prevailed. The study of comparative religion has shown that in this, as in all other "Becomings" in the cosmic process, there has been growth and development. The subject is a large one,

* "Primitive Culture," vol. i. p. 418.

and need not here be laboured. I shall simply assume that the growth of the idea of God has kept pace with human progress—intellectual, æsthetic, scientific, ethical, and social.

But to allow this, so far from undermining or abolishing the function of religion, is to set it on a firm basis, and to make manifest its vital significance as a factor in the process. More particularly, there is herein revealed the inadequacy of the principle of "adaptation," taken by itself, to serve as a key to the riddle of the universe. If we confine our attention to the mere phenomena of adaptation to environment, we lose sight of the real fundamental which causes adaptation—the will-to-live; and hence, also, of the really noteworthy results of adaptation, such as knowledge, art, and love.

IMPULSE TO FULLER LIFE

For if we study the various stages of adaptation, starting with primitive irritability as the lowest mark of life, we find that the result has been an increasingly valid apprehension of the environment in the form of knowledge of motion, heat, light, sound, taste, and the rest. When we come to the highest stages, knowledge expands until a desire arises to "explain" the phenomena—to interpret them in such wise that they acquire consciously apprehended meanings and values. There is a "thought" world which is based on, but set over against, a world of sensuous stimuli. And out of this "thought" world arise, spontaneously and naturally, the worlds of science, ethics, philosophy, art, and religion. There are varying degrees of clearness in the systems thus developed; but the root impulse is everywhere and always the same—to find some explanation of the universe that shall satisfy the intellect and respond to the needs that well up out of the depths of consciousness.

Religion, however, is peculiar in this respect, that it

forges ahead of exact knowledge; it evolves concepts which, though dimly apprehended, are intensely operative in our life and conduct. Increasing knowledge gives fuller content to religious feeling, clarifies it, and guides it. But the fundamental impulse is the same throughout—a craving for fuller life and for a firmer grasp of ultimate reality. It thus stimulates emotion, inspires hope, vitalizes action. And just as altruism, though apparently contradicting the cosmic process, in reality furthers it; so, too, religion has proved itself to be a potent agent in the struggle for life, more especially by inspiring ideals, and by supplying driving force for their actualization. Instead, then, of being something external to the world-process, religion is seen to be a living integral factor in the evolutionary process, and in harmony with the evolutionary principle. It is the worthier the more it is in accord with knowledge and reason; but it transcends them, and effects results which are beyond their range.

RELIGION SEEKS FOR COSMIC UNITY

When considering the unity of the Cosmos, we saw that science, metaphysics, and religion all concur in their ultimate aim—the discovery of cosmic unity. We saw also, in opposition to Comte, that each persists, because each seeks to establish this unity in its own way. The tap-root of religion is the felt affinity between our purposes and ideals and those which are immanent and active in the "natural" order: it lives and thrives in the conviction that the totality of experience will respond to the deepest cravings of our nature. Thus viewed, it is not in antagonism to the mechanical aspects of Nature, but only to that world-view which stops short at the mechanism, instead of seeing in this a phase of an all-comprehending spiritual process. Thus the history of the growth of religion does not explain it; nor does any

conception of its merely biological function sound its depths. Its secret is found in the fact that all things, as Plato said, seek after the absolute and all-comprehending Good. It is the striving after the ultimate goal that urges us on to higher conceptions of God, and to greater efforts to be like Him. And thus it is the most cogent of all witnesses for the existence of a Supreme Personal Being from Whom the whole process emanates, and in Whom its manifold modes and phases find their unifying Centre and their Goal.

The inwardness of this cosmological view of religion is well brought out in a passage from Wallace's "Prolegomena to Hegel's Logic": "Spencer and Mansel, Hamilton and Mill, are nearly all at one in banishing God and religion to a world beyond the present sublunary sphere, to an inscrutable region beyond the scope of scientific inquiry. He is the Unknown Power, felt by what some of these writers call intuition, and others call Experience. They do not, however, allow to knowledge any capacity for apprehending in detail the truths which belong to the kingdom of God. The whole teaching of Hegel is the overthrow of the limits thus set to religious thought. To him, all thought and all actuality, when it is grasped by knowledge, is from man's side an exaltation of the mind towards God; while when regarded from the Divine standpoint it is the manifestation of His own nature in its infinite variety." *

Haeckel and others of his school have struggled through to the conception of a single Substance, which includes matter, energy, thought, spirit—all that exists or can exist. Religion is in harmony with this line of speculation; but instead of speaking of "Substance," it speaks of God. Making this substitution, grounded on the series of inferences we have established from facts of experience to Ground, we may adopt the language which

* "Prolegomena to Hegel's Logic," p. xxvii.

Herbert Spencer applies to his Unknown Being behind phenomena. He is speaking of that abstract belief common to all religions which becomes more distinct as they develop, and which remains after their discordant elements have been mutually cancelled. It is the belief, he says, " which the most unsparing criticism of each leaves unquestionable, or, rather, makes ever clearer. It has nothing to fear from the most inexorable logic, but, on the contrary, is a belief which the most inexorable logic shows to be more profoundly true than any religion supposes."

UNIFYING STAGES IN EVOLUTION OF RELIGION

What has been the actual course of the history of religion ? A brief glance at this will show how religion is becoming more and more, not a detached department of human experience, but an integral part of an interconnected whole. In the earliest stage, though reason was implicit, it did not declare itself. The chief part was played by emotion—fear, need, hope, surrender. The modes of experience hence resulting gradually became the subject of meditation and inquiry ; but intuition and imagination still kept the upper hand. When at last genuine philosophic thought emerged, there came a critical sifting of the materials ; science, art, morals, sociology detached themselves temporarily to undergo more or less independent development. Before long, however, attempts were made to bring together these scattered elements in experience, and to trace their relations to one another and to the concepts of religion. Also within the sphere of the religious life itself there arose questionings which led to a criticism of its characteristic concepts—the outcome of a dawning desire to give a firm basis to those which stood the test, and to join them up with those derived from other intellectual

and emotional activities. It is this stage which is now so prominent in modern life. The advent of the evolutionary hypothesis has at once stimulated criticism of the received doctrines of religion, and enriched us with materials for coming to wider and deeper conclusions in our attempts to assess their validity. And there are signs on every hand of the birth of a new stage—that of reconstruction. It is to this we look forward with unshaken faith in the grand ultimate—a Ground of the total process Who is a personal, purposive Agent—Who, while passing our comprehension in His fullness, is yet so far genuinely known to us that He brings into a living unity every factor in the manifold of our experience.

CONDITIONS OF A RELIGIOUS WORLD-VIEW

If we are to have a religion which can thus unify the varied phases, modes, and stages of Being, it would seem that it must satisfy three conditions. In the first place, it must not only not be inconsistent with our reason, it must itself be rational; not in the sense that all its contents are comprehensible by the intellect, but in the sense that the rational elements in our experience find natural place in it. In the second place, all the facts of experience (especially the facts revealed by science and history) must be in harmony with, and form integral parts of, its complete systematized exposition—so far as exposition is possible. And, thirdly, it must be genuinely universal; it must exclude ultimate dualisms and pluralisms; otherwise it cannot provide any principle of unity such as can satisfy the claims of science and metaphysics, or furnish a firm foundation for cosmic hope.

These conditions are increasingly satisfied when we accept the inference from the facts to the Ground. And inasmuch as religion actually imposes these conditions, and by a universal instinct, or impulse, feels its way to

a world-view which satisfies them, we have a warrant of tremendous strength for believing that our inference will bear the weight we have placed upon it. We may have confidence that our strivings are not in vain, and that their results are not lost in a meaningless cosmic welter. With Spinoza we may say, though with fuller meaning—*Vita est meditatio vitæ, non mortis.*

SUB-HUMAN RELIGION

We saw grounds for maintaining that reason and moral sense could be traced in the sub-human sphere. Have we any grounds for tracing there the presence of what we call religion? Speaking for myself, I have no hesitation in giving to this question an affirmative answer. Argument here is difficult because of the multitude of definitions of religion; but the issue is fairly clear if we content ourselves with the simple statement made at the beginning of this chapter, that religion implies belief in, and dependence on, a superhuman being or beings. We shall, of course, have to vary the terminology to suit the new problem. The core of the matter is conserved if we put it thus—feelings of dependence and devotion stimulated by the presence of superior beings. I do not claim that such feelings constitute religion in any developed degree; but they furnish the material out of which the human feelings of dependence and reverence may naturally spring. Religion is there in germ.

Two thinkers of no less repute than Comte and Herbert Spencer (the former the more strongly) were inclined to see the beginnings of fetishism in the behaviour of dogs when alarmed by thunder or by some unexpected movements of familiar objects. Lenba, in his valuable work, "A Psychological Study of Religion," does not see his way to allowing the fetishistic interpretation, but comments thus: "And yet who will say that

in none of these instances there is anything corresponding to the anthropomorphic interpretation of natural events so common among men of little culture." And if this much can be allowed of the emotion of fear, how much more should we allow to the emotions of love and dependence so often manifested by dogs for their masters! At any rate we may conclude that the experiences which, when subjected to human reflection, lead to human religion are present in the higher animals, and only need a touch from the magic wand of self-consciousness to wake them into fuller development.

RELIGIOUS CONCEPT OF CREATION

The conclusion to which this brief survey of a vast subject would lead is this. Behind the cosmic process is a Personal Power—a Power manifested in unceasing life, action, freedom. When a centre of the will-to-live attains to self-consciousness and becomes a moral agent, he comes into conscious relation to this Personal Power —realizes his dependence on it—trusts to it for the realization of his ideals. The feelings evoked by this attitude to the Supreme Person, the ultimate Ground of all Being, constitute that elusive, yet most significant, of all the facts of our experience which we call Religion —a fact which puts the coping-stone on our cosmological speculations, and which, at the same time, gives us power to live as Sons of God.

CHAPTER VI

THE EVIL IN THE COSMOS

HAVING examined the evidence for moral freedom, we are at length in a position to deal with the problem that has so often dogged our steps and cast a sinister shadow over our speculations—the problem of Evil. If the Cosmos is a revelation of order and progress, we are compelled to acknowledge it has its dark side; "the whole creation groaneth and travaileth together in pain until now." And with the recognition of a power of genuine moral choice, we have to face, not only the existence of imperfection, pain, and sorrow, but of that which is the darkest feature of all, moral evil or sin.

I propose to limit myself here, as elsewhere, to those aspects of the problem which more directly concern the relation of the Creator to the created; and I would ask my readers to remember this limitation when they find that certain well-known attempts at a solution are passed over lightly or are omitted.

I have based much of my argument on a denial of the doctrine of creation *ex nihilo*. Can I repudiate this denial now that the origin of evil is before us? For it seems to be obvious that if everything that exists has its Ground in the creative activity of the Supreme Being, we shall in consistency have to attribute to Him the source of the evil as well as of the good. Let me at once say that I am quite prepared to defend this position; but let me at once add that I believe this position may be maintained without either impugning the goodness of the Creator or making Him directly responsible for the actualizing of the potentialities of evil. For though it

may be true that the conditions which render evil possible could not exist apart from the Creator, it may none the less be true that these conditions are a means to the realization of the goal of the process, and are in themselves without taint of evil.

THE DARKER FEATURES

The amount and the extent of the evil in the Universe is a trite theme which need not be enlarged upon here. A striking indictment of Nature, written with intense feeling, is found in Mill's " Study of Religion," an essay easily accessible to which I would refer those who want to see a strong case strongly put. Speaking quite generally, we have to face the fact that evil, in a large sense, is no merely partial and passing phenomenon, but is of cosmic extent and significance, and of tragic persistency. It is not only portentous in amount, but often apparently capricious in its incidence. Moreover, as consciousness has developed there has been a concurrent increase in the capacity for pain, and mental has been added to physical suffering. Sheer ignorance is productive of a large mass of misery, disease, and premature death. And, as if this were not enough, with the dawn of the moral sense (the highest form we know of what evolution has achieved) there emerges the direst form of evil, that of sin.

We may try to blunt the edge of these difficulties by emphasizing the small range of our faculties, the paucity of our data; we may stoutly maintain that " love is nature's final law " though she be " red in tooth and claw "—but the facts remain, and constitute inalienable factors of our experience. We may pathetically cling to the thought that the pain and sorrow of the world are only relatively evil—but the greatest enigma, moral evil, seems to be incapable of having any soul of good at all. Truly the problem looms dark and drear for those who

would "justify the ways of God to man." And yet I am bold to maintain that we have no cause for despair in our efforts to find some adequate solution. We have not yet discovered the secret in its fullness; nevertheless we are gaining fresh light every day, and are securing firmer ground for a healthy optimism.

THE BIBLE AND EVIL

Does the Bible present us with a solution? Let Job answer—let St. Paul answer. The fact that there is a mystery is abundantly recognized, but there is no definite attempt at explanation. It takes as its background for the great drama an existing opposition between the powers of good and the powers of evil.

I do not emphasize the implicit dualism of the Genesis cosmology; I have already dealt with that, and have tried to show that, since matter is but a lower plane of spiritual existence, it cannot be in essential opposition to the higher planes. We must seek elsewhere for the source of evil. That which is to the front from beginning to end of the Bible is evil as presented in the facts of human experience—the mystery of pain and sorrow—the mystery of sin. I say "the facts," because, in common with many thinkers of the old world, the scriptural writers simply assume the opposition of good and bad, and following the lead of a deep-seated intuition, give it a personal setting.

In the Persian myth, for instance, there is the conception of a continuous conflict between two creative powers; Ormuzd from time to time asserts himself in beneficent creations, and is as frequently thwarted by the counter-creations of Ahriman. Later, these contending Powers took more abstract form as Light and Darkness. And it is significant that, later still, the desire for a principle of unity induced certain cosmologists to assign to the rivals a common origin—that of Boundless Time.

Now these are the conceptions which are more or less consciously adopted and spiritualized in the Bible. In Genesis, the pre-existence of evil is taken for granted. There is the Devil who tempts, and mars the creation that was "very good"; there is "the tree of the knowledge of good and evil." They are introduced quite simply and naturally, with no attempt to explain their origin or their relation to the Creator. Later, in the Prologue to St. John's Gospel, there is the bold and unexplained opposition of Light and Darkness, but no definition of their source or relationship. St. Paul develops his striking conception of a Prince of this world who is in antagonism to the Son of God; he recognizes the existence and activity of an opposing power in the universe which has to be defeated and subdued; and he affirms an ultimate unity when "God shall be all in all." But he does not go behind the facts as he states them. In the Apocalypse we have in vivid imagery the course and the issue of the conflict between the power of good and evil, but nowhere attempts to tell how such a conflict is to be harmonized with the existence of a holy and omnipotent Creator.

THE GNOSTICS

The Gnostics were the first Christian cosmologists. Their primary aim was to free the Supreme Being from all responsibility for the production of evil; they tried to remain true to Christian doctrine, but allowed themselves to drift into teachings so fantastic that the Church could no longer acknowledge them. They held that the universe was not an original creation of God, but a deterioration from His Being as pure Spirit. The goal of our existence is the overcoming of the grossness of the material universe and the return to the parent Spirit.

These thinkers (and more especially Valentinus)

accounted for the coming into being of the world as the result of a perverse, if not blind, activity. Of the various emanations from Deity, one, the Demiurge, far removed from the heavenly Pleroma, was moved by some flaw in his nature to imprison the ideal and the infinite in matter. This was the great sin of sins, and redemption is to be sought in reversing the transition. It is sufficiently obvious that this leaves untouched the fundamental problem while arbitrarily adding to its complexity; but at any rate it was a first attempt from the Christian side, and deserves recognition.

The starting-point here was the doctrine that finiteness is in itself a falling away from good—there was a confusion between imperfection and evil. We must rid ourselves of this grievous error. An amœba may be, relatively to its mode of existence, as perfect as a humming-bird; a bud as perfect as a flower; a child as perfect as a man. And so each stage in the cosmic process is valuable, not merely as a means to what is to follow, but in and for itself. Values increase as the process advances; but each value is real and intrinsic in its place. And thus life is worth living, not simply as a preparation for another, but because life itself is good. "Truly the light is sweet, and a pleasant thing it is to see the sun."

SOME MODERN PESSIMISTS

These speculations from the Gnostics find a strange echo in the leading ideas of such philosophers as Schopenhauer and von Hartmann. A blindly heaving Will, or an Unconscious, is supposed, in some inconceivable fashion to have become divided against itself by assuming the forms of definite being. Disaster has resulted; and redemption has to be sought in conscious willing to undo the tragic mistake. Consciousness and reason are

devices for securing the reversal that is to reduce everything to its original unconscious formlessness.

Thus in ancient and modern pessimist we meet with the same root idea, that the existence of the universe is a large mistake, that it brings with it evil and misery, and that we must strive to reverse the process. Apart from the inherent critical weaknesses of this cosmological fantasy, it is plain that it affords no solution of the main problem, nor a glimpse of a rational alleviation of it. Whether we start with Absolute, or Will, or the Unconscious, we ask—Why and whence the mistake? And there is no valid answer possible. Whereas, when we regard the process as purposeful and as increasing in value, we may anticipate satisfaction both for reason and for feeling.

CHRISTIAN ATTEMPTS

The early Christians were repelled by the extravagances of the Gnostics, and, to avoid them, insisted on the traditional explanation of the story of the Fall. Their teaching may be briefly stated thus:

Evil, so far at any rate as this world is concerned (the anthropocentric point of view is taken), is the result of the sin of the first man. The effects of that sin are felt, not only by the human race, but also by the animal kingdom, and are discerned in the general constitution of the earth as man's home. As regards man in particular, all Adam's descendants are tainted by his act of disobedience, and are by nature in rebellion against God.

Our concern now is not with the doctrinal aspects of this conception, but with its bearings on the problem of creation. From this point of view, and in the light of recent knowledge, we welcome its emphasis on the hereditary factors in the development of the race—factors which are of paramount importance for a more adequate explanation of sin. But from the cosmic

standpoint, we are compelled to ask—Whence came the Devil? The difficulty is not solved—it is only moved a step farther back. It was a great gain, however, to swing clear of Gnostic vagaries; and the deficiencies of the doctrine were pragmatically supplemented by bringing the Logos doctrine into vital connexion with the actual life and teaching of Jesus Christ. But the reaction was not strong enough to save the Church from an undue tendency to asceticism—that is, to a view of the world which set it in opposition to God and regarded it as, in itself, the source of evil. It is this ascetic tendency which enabled a pessimist like Schopenhauer to maintain that Christianity is definitely on his side, as being a religion of renunciation.

No, we cannot rest content with any theory which separates the Creator from His world or holds its existence to be an evil. Nevertheless we may profitably reflect on the fact that we are not yet able to estimate the strength of the resistance which evil opposes to the effecting of God's purposes. See how slowly the cosmic process works! Calculate how many millions of years it has taken to evolve man, and how far he still is from being socialized! On the other hand, to our comfort we know that the curve is upward, and we can therefore patiently wait and work for the Good which in the fullness of time will be attained.

PANTHEISTIC ASPECTS

In sharp antagonism to all dualisms, implicit or avowed, stand the group of theories which may be roughly classed as rigidly monistic, or as pantheistic. They are at one with Theistic theories in so far as they maintain that there is in the universe but one Power; but they differ from these latter in several fundamentals which are the occasion of divisions not easily overcome. Of these fundamentals, the one that most directly

touches our special problem is the doctrine that this one Power is identified with the totality of phenomena (regarded as matter, or as mind, or vaguely), and is conceived as acting with equal directness in each and every part of the manifold Whole. The simplicity hereby secured is exceedingly seductive, and commends itself to many types of mind. But it is purchased very dearly. For it implies that there can be no distinction between what is and what ought to be. Everything that exists or happens is an equally direct act of the one Power, and must be acquiesced in as such. Freedom of any kind is impossible—as impossible as in a universe of physically determined mechanism.

How, then, account for our actual experience of rebellion against pain and evil? The rigid monist or the Pantheist will tell us that we must regard evil either as a negation or as an illusion. He has a syllogism. Given the Absolute, nothing can come into existence that ought not to exist: evil ought not to exist: therefore it does not exist. The problem of evil is not solved —it vanishes!

But the "natural man" objects to this vanishing. He asserts the facts of his actual experience. He feels and knows that there are things which ought not to be, and he strives to change them. What, he asks, is the relation of this experience to the one all-inclusive Power? Those who persist in the rigid monistic doctrine can only advance the doctrines of negation or illusion. If they are less rigid, and allow some weight to the pronouncements of sense and reason, they have to credit the one Power with the evil as well as with the good, and hold it to be of as mixed a character as is the universe we know. Such conclusions are subversive of all that makes life worth living—of all that gives it hope and value. A healthy mind refuses to be driven to such an impasse. It will set out to evolve some explanation

less like the insanities and inanities of a nightmare. Fortunately we are not reduced, either in theory or in practice, to an extremity so despairing.

As regards pain, we are told it is either an illusion, or a negation, and therefore unreal. But why should a mere negation involve positive suffering? Why should the Absolute delude itself? Unless we can see some reason for the suffering—some end to be attained—unless there is something more than dead necessity, the mainspring of activity is broken, and there remains nothing but a passive endurance under the strain of which the noblest natures must succumb.

When we turn to the phenomena of moral evil, the case is still worse. On this Absolutist theory, Nero is as good as St. Paul. And if those whom Nero persecuted took a different view, this only showed how far they were from understanding the mystic "Thou art It"—that is to say, how far the Absolute was from understanding itself. What a tissue of absurdities! And what is gained?—a purely theoretical simplification of a complex problem. The world, in one of its aspects, is pluralistic—it contains individual centres of the will-to-live dowered with what is at least a derived measure of initiative and creative power.

PAIN AND EVOLUTION

Passing from this rigidly monistic, this Absolutist universe, in which there can be no real change or development, let us turn to see what implications for our problem are suggested by the cosmology which takes change and development as its fundamental principle. And let us first ask what light the evolution hypothesis can throw upon the existence of pain and upon the apparent capriciousness of its incidence.

We saw that one rôle of matter may be to set up oppositions which provoke efforts in centres of the will-

to-live, and so lead to the upward development of those centres. May we not surmise that pain has a like rôle? If we insist upon the punitive aspect of pain, as fully accounting for its imposition and its incidence, the case seems hopeless: even the speculations as to pre-existence cannot render it just or reasonable. But if we expand our view, and see in it a cosmic agency having a definite function in a purposive system, it becomes at once more understandable and more bearable. We can better accept St. Paul's declaration that it is "working for us more and more exceedingly an eternal weight of glory."

Evolutionists have sufficiently proved that pain is one of the chief driving forces in effecting organic development, and that it has a potent share in preserving the upward trend of the curve of life. May we not find here a partial explanation of its seeming capriciousness? Matter is quite as capricious in the oppositions it sets up to the fulfilment of individual desires. In each case we may gather that the process is to be judged, not in separate bits, but as a working whole. Let me add, however, that we have good reason to believe that the interests of the individual are of greater import, and are better secured, as the process advances.

I do not for a moment maintain that the whole mystery of pain is hereby solved; there is an unexplained residuum. Could we not have had a process for which pain would not have been a condition of progress? I shall deal with this deeper thought directly. But already the burden is lightened—pain is a means to an end—an end that is both cosmic and individualistic; and that end is fuller and nobler life.

MORAL EVIL AND EVOLUTION

Such reflections distinctly alleviate the problem of pain. But what of moral evil? Can evolution help us here? I answer unhesitatingly that it can. Let us

start from the Augustinian theory of sin—a theory that holds its own to the present day. To be a moral agent is to have the power of making a choice between real alternatives; moral choice involves the possibility of wrong choice; wrong choice means moral evil. I adopt this theory in substance; but I would give it an evolutionary turn.

I shall assume, what I shall maintain in another chapter, that the end, or goal, of Creation is the development of "Persons"—individual moral agents who are to be thoroughly socialized, so that they may live in, and through, and for, a Kingdom of Spirits. Now there is an Hegelian triad which is most suggestive in this connexion—Innocence, Sin, Virtue. The thesis, innocence, is a happy state, but it is not the highest; it is excelled by the synthesis, virtue, which implies an active and fully conscious adhesion to what is good. The antithesis, sin, involves a knowledge of and acquiescence in what is not good. And it would seem that innocence cannot pass into virtue without experience, direct or indirect, of this intermediate member of the triad. I do not say (nor, I imagine, would Hegel say) that the actual experience of sin is necessary; but at any rate there must be possibility of such experience and knowledge of what it means. In other words, innocence can only pass into the higher stage called virtue by the exercise of a genuine and conscious choice between good and evil. Granted, then, that the cosmic process aims at producing virtue, it must also furnish a real chance of developing sin.

NEW VIEW OF SIN

Interpret this bit of Hegelian logic in terms of the evolution hypothesis. The process passes through stage after stage as it rises from atom to molecule and crystal, and from these to plant, animal, and man. The process

is continuous and involves the output of effort on the part of the developing centres. But when we speak of rising through stages, we must not imagine that the stages preceding any particular point of development are abolished or altogether superseded; they are incorporated into higher unities, and unceasingly transformed.

We can thus see that each stage, in its order, so far from being evil, or even imperfect, is a means for the development of what is to succeed, and is carried on with more or less of refining modification. But the transitions may not always be easy, especially in cases where there are changes in the environment which demand more or less considerable adaptation. If it is objected that the constitution of things might be such as to provide for ease of transition, we may recall the fact that effort is necessary to progress; it is the struggle for life that brings in its train increasing fullness of life.

When we consider the higher organisms, we find in them certain so-called physical tendencies, together with certain more definitely psychical tendencies—appetites, instincts, impulses, desires, and the rest. In the course of their development, racial or individual, these varied factors are always changing in their strength, direction, and relations to each other. None of them is evil in itself; but any of them may become a source of suffering, if in the transition from a lower to a higher stage it is not adjusted to the new conditions. It has to be modified, subdued, harmonized with its new environment.

Now we do not call a man-eating tiger a murderer; nor condemn an infant for fractious behaviour; nor judge a savage by the ethical code of civilization. Such cases of imperfect development often cause much suffering, but we cannot call them morally evil. Sin, properly so called, can only arise with the development of the moral sense, with the consciousness of the distinction

between right and wrong, and with the power of free choice between opposing moral alternatives. It cannot, therefore, be inherited. What are inherited are the varied dispositions, impulses, and the rest, which afford material for moral decisions. Sin is the failure of an individual agent to be faithful to a standard which he recognizes as at once good and attainable. It is thus seen to be, not a fall from a perfect to an imperfect stage, but a failure to rise to the more perfect from the less perfect, when ascent is possible. The savage is not a degenerate saint, but a potential saint; and the actualizing of his potentialities will be in proportion to his obedience to such higher moral ideals as he may be able to develop. Tennyson exclaims:

Oh that the man may arise in me
That the man I am may cease to be.

Not that "the man I am" is evil in and for himself, but that he becomes so in relation to the higher man that asserts itself and is in the line of true and destined development. For myself, I conceive that this liberty is found in Nature as a whole, varying in degree according to the stage of development; and I trace its presence in those uncertainties (trial and failure) which are so marked a characteristic of the process. In the case of man, reflection on moral alternatives leads to conflict between lower and higher factors in his nature. *Video meliora proboque, deteriora sequor.* Hence the need for effort, which is as essential to moral as to physical progress—which educates powers that are potential and gives them definite character. There is a development of the "moral germ" (so to speak) as of that of the embryo.

We can therefore legitimately give an evolutionary turn to St. Paul's pregnant statement, "first that which is natural, then that which is spiritual." And we can

add the thought that, just as he looked on the law as "a schoolmaster to bring us to Christ," so we may deem the element of conflict in our moral experience to be a means of leading us through the stage of innocence to that of virtue. The animal in man remains so long as he is man; but it becomes increasingly the servant of his higher ideals and his spiritual aspirations.

DEEPER SOLUTIONS

The teachings of evolution suffice to show us that there is not an ultimate antagonism between the evil and the good, but only between lower and higher stages of being; and where this antagonism exists, it is a sign that the highest has not yet come to the birth. The world is in the making. The process is seen to be moving on to the attainment of purposes in which the discords will be resolved, and "good shall be the final goal of ill." In the light of modern science we can understand somewhat better than Job how the Creator works, and can "trust Him," not merely because He manifests Himself in the sublimity of power, but because He is granting to us, with growing degrees of clearness, glimpses of the aims He has in view and of His methods in achieving them.

We can also apprehend how that God may create the conditions that make moral evil possible without Himself being responsible for, or implicated in, that evil. If the aim of the cosmic process is to bring into existence moralized and socialized "Persons," their Becoming must involve the possibility of real moral choice; it will therefore necessarily be accompanied by the possibility of moral evil. And since the process makes for the elimination of all that opposes the good, the final issue cannot be doubtful. The Hegelian triad will be justified—Innocence and Sin will find their synthesis in Virtue. We need not be unfaithful to the *ex nihilo*

nihil doctrine, not even when confronted by the ominous fact of sin.

But I would not for a moment contend that we have here any complete solution either of the problem of pain or that of moral evil. We cannot stop short at the process—we ask what is behind it? Why should it be what it is, and involve the existence of pain, sorrow, and sin? If God be omnipotent and perfectly good, could not His end be attained in some less tragic way? Is this really the best of all possible worlds?

Such are the questions which press upon us insistently. We cannot yet hope (if ever) to meet them fully. But we can take things as they are, and increasingly realize that there is manifestation of purpose, and that the upward curve is towards righteousness and love. Clearly the universe has to attain its goal by traversing the thorny path of liberty. That the path should be thorny may warrant us in speculating, with Royce, that there is something in the nature of God Himself which renders suffering a condition of full and perfect life. There are many sides of our experience which seem to justify such a view; and we can certainly find in it deeper reason for repudiating the *ex nhilo* doctrine. It allows us to regard the Creator as a Being Who can "be touched by our infirmities," and Who can share our sorrows. "If God made the world," said a philosopher, "I should not like to be God; its woes would break my heart." Need we go so far as this? No. This is hysterical, though nevertheless richly suggestive. All we require is the thought that God shares the burden, and is Himself directly concerned to hasten the perfecting of His work. We need not shrink from such a view from fear that it would seem to make God directly responsible for the existence of moral evil. My previous argument on this point still holds good—the Ground of its Becoming is in God; the actualizing of the potentialities is in the moral

centres who are to become His "sons." A belief that "God cares" can indefinitely lighten the burden of the evil interwoven into the very structure of "the world that now is," by bringing us assurance that this evil is an organic, but passing, factor in a process which has for its goal a Kingdom of free spirits who shall be Sons of God.

CHAPTER VII

IMMANENCE

I HAVE maintained creation by process in opposition to special creations, and have inferred that the universe is not a finished product, but a world in the making. I have also endeavoured to show that the facts definitely point this way. Even in the physical sphere, the revelations of modern astronomy, the physicists' discoveries of atoms and electrons, the whole trend of biology—all these display everywhere building up and breaking down —everywhere and always change—resulting in an upward curve or spiral of evolutionary progress.

If the movements were simply movements, mere changes in Time and Space relations as between the parts that make up the Whole, even so they would argue a Ground everywhere and always active. But they are more than this—they are co-ordinated in a process which reveals advancing complexities, purposes, and values. There is continuous Becoming—continuous emerging into existence of what is genuinely new. The Ground, therefore, must be continuously creative ; and the creative act must be coextensive with the Becomings.

NATURAL AND SUPERNATURAL

But if God is thus always and everywhere active, a question arises concerning the possibility of fundamental differences in His modes of working. More especially are we met by the distinction so generally drawn between " natural " and " supernatural."

To discover the origin of this distinction we must go back to primitive animism ; and we thereby also dis-

cover its true character. In his struggle to live, man soon learnt that there were certain common happenings, certain familiar sequences of causes and effects, on which he could depend. They were fixed, and frequent in their occurrence. These ceased to rouse his attention and wonder: they came to be taken for granted, without being attributed to the special will and action of beings akin to himself. But intermingled with the familiar and calculable happenings were others which retained more or less of the unexpectedness and inaccountability of human caprice. Hence there arose in his mind a consciousness of two sorts of events—those which could be reckoned upon, and those which could not. Developing thought classed the former as " natural " ; but continued to see, in the unfamiliar, evidence of the interventions of an order of beings regarded as " superhuman."

The area of man's knowledge became at last so enlarged that the " natural " happenings were sufficiently numerous to be called " the natural order," as over against a definitely recognized " supernatural order." Philosophers and theologians took up the distinction thus established, and hardened it to such a degree that it practically banished God from the greater part of His creation.

We see, then, how this distinction has always depended on the fact that man is ignorant of the causes of many happenings, and how it has varied the scope of its application as knowledge has grown from more to more.

DISASTROUS RESULTS OF FALSE DISTINCTION

We can understand and excuse the primitive thinker who evolved the distinction—nay, we can be grateful to him for thus far reducing to order what was then a

chaotic manifold of experience. We can also make allowance for the momentum acquired by a conception so deeply rooted and of such ancient standing. But it is hard to sympathize with the modern thinker who, with full critical apparatus at his disposal, still clings to a separation of the natural from the supernatural. So long as we are ignorant of the origin of anything, we are to ascribe it to God's working ; but when we have learnt something of its origin, we are to relegate it to the category of the secular ! Is it possible longer to maintain an attitude so illogical and so perverse ?

The results of such a philosophy have been disastrous. Science took up this idea of " natural," and indefinitely extended its range. At last, flushed with triumphs, it universalized it, and refused to admit that there is anything at all in nature that can be ascribed to agency akin to ours. Hence the deadly reign of Materialism and Naturalism—hence that separation of the spheres of religion and science which for three long centuries has wrought such grievous havoc. Scientists have been to blame—but not less so the Church. From mediæval days to the present, actuated by various motives (some good, some bad) Christian theologians have distinguished the religious from the secular, and have barred the way to a free and healthy study of nature.

The most serious instance of the mischief wrought in recent times by this false distinction is that of the reception given to the evolution hypothesis. On the one hand, many scientists hailed it as giving a death-blow to religious conceptions of the world. On the other hand, many Christians violently condemned the idea that the world could evolve gradually and regularly, or that the varied forms of life on the globe could be organically connected. It seemed to them that to accept such doctrine would be equivalent to atheism ! So long, indeed, as the scientist confined himself to astronomy,

chemistry, and the physical sciences, he was only "suspect." But when he tried to discover law in the spheres of life and mind he was violently denounced. In short, it was only too evident that both parties had as common ground the idea that every fresh scientific discovery excluded God more and more as the operative agent in the universe. The phrase "the conflict between religion and science" came to be accepted by all concerned as expressing a necessary and inevitable opposition. Nor is the danger even yet wholly passed, though increasing numbers protest against the faithless fallacy.

UNIVERSAL IMMANENCE

Now the moment we adopt the idea of creation by process, all valid reason for holding to this distinction disappears. No part of the Cosmos is out of the range of the continuous activity of the Creator. We have not a machine set going, the working of which requires special and constant interference to keep it in order. There is no inherent defect in the constitution of things which necessitates intermittent repairs. God is seen to be working everywhere and always. As Carlyle puts it, "through every star, through every blade of grass, through every human soul, the glory of a present God still beams." Or as Tennyson has finely expressed the same thought:

Speak to Him thou for He hears, and Spirit with Spirit can meet,
Closer is He than breathing, and nearer than hands and feet.

We men have to distinguish between creation and co-operation, between formation and administration. But when we attempt to analyse the Divine activity, these distinctions have no place. Nature is one vast organism which develops inherent potentialities—ope-

rates through resident forces—is grounded, sustained, and transfused by the Divine Being of Whom it is a manifestation. The old idea, grand in its way, was that the earth trembles at God's nod. The new idea is that earthquakes are phenomena which have their place in the series of physical changes through which our cooling globe is passing. The shaking is not due, as in the primitive conception, to an isolated external act, but is a manifestation of the Divine Energy which occurs in "the fullness of time" as a member of a purposeful series of happenings.

But it may be objected that this doctrine of continuously active immanence puts God farther away from us. Not so. Such a fear is a remnant of the traditional prejudice, and shows that the doctrine of universal immanence has not been firmly grasped. The long-prevailing, false, though tempting, Dualism is hard to scotch. We have to learn to see God directly at work, not here or there, not at this time or at that, but everywhere and always. Looking out on the universe we see God, not in the wholeness of His Being, but in that manifestation of it which gives us the Cosmos.

GRADES OF BEING

Thus to assert that all phenomena alike are externalizings of God's own nature does, indeed, universally spiritualize them, but does not forbid us to recognize that there are "grades" of being. On the contrary, the very conception of evolution involves that of a scale of ascending values. St. Paul, using the terminology of his day, is in full harmony with this idea—"first that which is natural, then that which is spiritual." Deeper still, because more fraught with appreciation of nature's processes, was the insight of Him Who bade us watch the growth of the wheat: "First the blade, then the ear, then the full corn in the ear."

IMMANENCE

Herbert Spencer has pointed out that the evolutionary process tends to greater complexity. This is to stop short at a purely physical category—mere complexity simply implies intricate space and time relations of parts to parts. Unless the growing complexity brings with it greater and fuller values, nothing is achieved. Value, therefore, not complexity, must be our touchstone if existence is to have any true meaning. The brain of a Newton is more complex than that of a dog. But the mere building up of molecules into brain-cells, regarded solely as a physical fact, can never explain the difference between Newton and the dog. With the advent of Newton there came into existence a mind which could weigh the suns and speculate on the constitution of the universe. The world of mind within gained in grasp of the world without. The philosopher's thoughts are not only more complex than those of the animal—they transcend them indefinitely in meaning and value. Physical energy may or may not be conserved, but values increase : the former doctrine is in dispute, the latter is patent to our daily observation. Hence the pregnancy of the searching question : " What shall it profit a man if he gain the whole world [externally viewed] and lose his own soul " (the goal of the process) ?

TRANSCENDENCE

I have already guarded myself against the idea that the world, as an externalizing of God's Being, exhausts that Being. To say that God is immanent in the universe is by no means to say that He is dissolved in the universe. The process has its Ground in the Divine Energy ; but to equate God and the process is as logically unjustifiable as it is inherently improbable. Logic forbids us to convert *simpliciter* the universal, " The world is God," into " God is the world." The fallacy is all too painfully obvious—and yet so common !

Philosophy forbids us to imagine that a Personality can be identified with, or merged into, its manifestations.

After all is said that can be said in the bandying of arguments about Immanence and Transcendence, it would seem that the issue is an idle one. For when we go a little deeper into the implications of the terms, we realize that they are but symbolic expressions borrowed from the concept of space; and spatial symbolism is apt, to say the least, to mislead us in speaking of spiritual existence. And so it may be that, in a very real sense, God is wholly present in every part of His externalizations. It is thus that Tennyson can say of a flower:

If I could understand
What you are, root and all, and all in all,
I should know what God and man is.

Suppose this to be true (as I myself believe it to be true), still God is not the flower. The fact is that in dealing with the concept of the Infinite, we can juggle with contradictories that render exact reasoning hopeless. Witness a recent authoritative and widely accepted definition of Infinity: that in which, any part being taken, it is equal to the whole. This puts us in mind of the old aphorism: God is a circle the centre of which is everywhere, and the circumference nowhere. And what is this but to confess that spatial concepts fail us when we come to grips with the concept of Spirit? The famous controversy largely turns on a confusion of thought.

PANTHEISM AND CREATION

When we study the history of Religion, we find that the doctrine of Immanence easily passes over into Pantheism. That this transition is neither logically nor philosophically necessary I have endeavoured to show in the preceding section. But Pantheism can be

embraced on its own merits, and does, as a matter of fact, possess a peculiar fascination for multitudes of human beings. I therefore turn to consider briefly its central principle—the All is God. The idea of creation is atrophied.

Much will of course depend on what is meant by the "All." As against a naturalistic Monism we have to insist that it must include, not only impersonal Energy (be it matter, force, or other like concept), but also will, reason, feeling, individuality, moral sense, and personality. I need not further enlarge on this theme; but I would point out that its force is undiminished as against that "mystical" world-view more usually associated with the word Pantheism. However many may be the mystic elements introduced into the concept of God, we must not be induced to loose our hold on the facts of experience. Soar as we will in the empyrean, we must start from, and return to, mother earth, if we would not be launched into a pulseless vacuity.

With the Eastern mystics, and with many of their present-day Western disciples, there is not any real world to be accounted for—our experience is simply an illusion. The world of sense is at best a transitory and inexplicable phase of a timeless and unconditioned Being into whose Nothingness we must all strive to be absorbed as speedily as we can. True, as I have urged in considering the concept of an Absolute, the very idea of an Unconditioned conditioning itself is self-contradictory; but we have here the additional absurdity of supposing this conditioning to be an illusion! We have a God Who is Nothing giving birth to a world which is Nothing. Can irrationality further go? The philosopher cuts off the limb of the tree on which he sits—he speculates about that which is not only beyond speculation, but which is not really there to serve as subject of speculation. All physical existence is dissolved; all distinctions

between good and bad, beautiful and ugly, are deprived of their Ground. To such a world-view we may with special relevance apply the famous definition of metaphysics—" a man in a dark room looking for a hat that is not there."

In religion there are, and ever must be, mystical elements—" deep calling unto deep." But it is assuredly not too much to ask that the mysticism shall be supplementary of, not rankly contradictory of, the most obvious facts of our experience.

DEISM AND CREATION

In antithesis to Pantheistic exaggerations of the doctrine of Immanence, we have an exaggerated emphasis on the transcendent aspects of the Divine Nature. The Deists would have us think of God as separated from His creation—indeed, as alien to it. They picture Him as dwelling aloof. He put forth His power in an unknown past and created the universe, endowed it with certain powers, and then left it to itself.

Some thinkers of a deistical turn of mind mitigate the rigidity of this doctrine by allowing that the Creator may occasionally intervene to put right things that have gone wrong, or even to supplement His original creative act. This is anthropomorphism of the false kind. It relies on the analogy of a human machine that may be wound up and left for a time to itself, but which must occasionally want repairs and reconstructions.

There are many serious objections to the characteristic principle of Deism—the separation of God from His creation. It is, for example, flagrantly opposed to the whole trend of religious thought and feeling, as well as to that of scientific teaching and speculation. Striving to be intellectual, it becomes crudely irrational, in addition to its obviously chilling effect upon the emotions. Our whole experience—practical, scientific, æsthetic,

moral, and religious—demands a God "in Whom we live and move and have our being."

Again, if God made the world just as it is, with all its imperfections and its suffering, only to leave it to itself, most of us would sympathize with the philosopher who said, "If God made the world, I should not like to be God, its woes would break my heart." No—the problem of evil presses us hard. But we cannot consent to a solution which is subversive of our belief that God is good—and He would not be good if He created the world as it is, and then left it to itself.

THEISM AND CREATION

We have before us, then, two extreme doctrines—Pantheism and Deism. The one identifies the world with God, the other separates Him from it: the one nullifies the idea of creation by regarding the world as the Self-Existent, the other, while holding that there was a creation, makes it a completed act, and separates the result from its Ground. Is there any mediating conception which can conserve the valuable elements which these contradictory systems respectively emphasize, and at the same time avoid their exaggerations?

The doctrine for which I have contended meets these requirements. If we combine the older Theistic ideas of God with those which we have developed out of the evolution hypothesis, we have a Creator Who is at once immanent and transcendent; and we have a world which is at once in a real sense (as composed of Persons and their interrelations) independent of God and yet dependent on His continuous creative activity—a world which manifests the Divine Energy, but does not exhaust it—a world of moral freedom which is a living part of the Divine Being. When once we accept the idea that God can create centres of the will-to-live which shall be essentially dependent on Him, and yet dowered

with a measure of His spontaneous initiative, we are rid of these contradictory exaggerations, and, at the same time, we are able to retain the truths which have been overemphasized. When we complete this idea of creation of will-centres by holding that they develop their potentialities in the course of an evolutionary process, we are in full harmony with the facts of experience.

The evolution hypothesis, then, interpreted by Theism, finds place for the Deist's insistence on transcendence, the Pantheist's craving for mystical immanence, and the scientist's adhesion to his hypothesis that all physical phenomena are varying forms of an omnipresent Energy. The way is open for free inquiry in every direction. Science, philosophy, theology—each and all can grapple with experience in its entirety. No mode of research or speculation is barred: no honest seeker for truth is "suspect." Light is welcomed from whatever quarter it may come. Feeling and intuition come to their rights, in due subordination to the dictates of sober reason. For by whatever road we arrive at truth, we arrive at that Being, always and everywhere active, Who is at once the immanent Source, Sustainer, and Goal of the Cosmos which manifests Him.

CHAPTER VIII

ENDINGS

We have considered the problem of beginning; and incidentally that of ending. There are certain aspects of the latter which call for somewhat more detailed treatment; and to these we now turn.

I have spoken of creation as a "process." Now it seems to be a necessity of thought that a process shall be a movement within determinate points. It will be observed that this is a different matter from that of an "absolute" beginning, or an "absolute" ending—we are dealing with a definite process, which, though it may be a member of an infinite series of processes, has yet a certain individuality and completeness on its own account. I here confine myself to the process which we actually know, and in which we are actually immersed.

ANNIHILATION

In asking what may be the end of our process, we may rule out annihilation. *Ex nihilo nihil* has served us well; it is only right that we should allow full weight to its correlative—*in nihilum nil posse reverti*. A thing may merge into something else—be transmuted or transformed: but by virtue of the fact that it is a manifestation of a self-existent Ground, it cannot disappear. We argue—something does actually exist: therefore something must always have existed. It also follows from a denial of creation *ex nihilo* that nothing which exists can be annihilated. Even the most fleeting phenomena are not projected out of nothing to return

to nothing, but are manifestations of the persistent being of the uncreated Ground. The manifestations may change their forms in a series of Becomings; but the changes only serve the working out of a purpose conceived by a rational, self-existent Will which uses, so to speak, "parcels" of its own Being to achieve that purpose.

This argument from the inconceivability of *ex nihilo* acquires support of a positive character when we recognize, in the ultimate Ground, a Person Who initiates a process which tends to a definite goal. We are then morally, as well as rationally, compelled to believe in a conservation of values, though the limitations of our faculties preclude our knowing what forms those values may assume.

AN ETERNAL EQUILIBRIUM

We have considered the scientific speculation of the running down of the physical universe to a dead equilibrium of its forces—and we have seen reasons, urged by physicists themselves, for rejecting it. A metaphysical parallel to this would be a cessation of change—a cosmic equilibrium which would supersede Becoming.

Such a line of speculation is not open to fundamental objections of the kind which block the way to the acceptance of annihilation. Herbert Spencer's idea of an evolutionary equilibrium, in which organisms should be completely adapted to their environment, has been mentioned and rejected. Evolution means change; and where there is change there must be continuous adaptation. And even were such perfect adaptation possible, the ideal is, to say the least, singularly uninspiring! It has been described as "an eternal afternoon tea-party." The "eternal" will not apply—for the solar system will not persist long enough to justify the epithet—but the rest may stand.

DR. M'TAGGART'S VIEW

Of a very different character is M'Taggart's speculation in his "Hegelian Cosmology." He conceives of a state in which knowledge shall be perfected and volition satisfied. The development and interpenetration of individual conscious centres will have become so complete that they will form one Being while retaining their individuality. The antithesis of the self and the not-self will have passed away, and the bond of union will be a perfect and a timeless love. M'Taggart calls this all-inclusive union the "Absolute"—a term which, to my mind, unnecessarily complicates the issues; but taking it in the sense he would give it, the following passage presents his conclusions in his own words: "The Absolute can only be perfectly manifested in a state of consciousness which complies with three conditions. It must have an absolute balance between the individual for whom all reality exists, and the reality which is for it—neither being subordinated to the other, and the harmony being ultimate. It must be able to establish such a unity between the self and the not-self that the latter loses all appearance of contingency and alienation. And, finally, in it the separate and unique nature of each individual must be found in its connexion with other individuals. We have found that knowledge and volition comply with none of these conditions. There remains only one other alternative at present known to us—love. I have tried to show that in this case all three conditions are fulfilled."

This speculation has singular attraction for me. It harmonizes more especially with my fundamental conclusion that the goal of the cosmic process is the perfect development of persons in a perfect society. But it lacks elements which seem to be essential to a full cosmology. First, and chiefly, for M'Taggart there is no one Supreme

Person behind the development—the unharmonized multitude of separate individuals is simply postulated. It is hard enough to give a rational explanation of development, and the necessity for it, even when we postulate a creative Ground : but lacking this postulate, the case is hopeless. Given a self-existent Person Who wills from within Himself a definite process which shall have a definite goal, the problem is at any rate kept within the sphere of concepts gathered from experience. Without this Supreme Person, creating, sustaining, unifying, we move in an unresisting medium which is perilously like vacuity.

But further, the elimination of volition and knowledge appears to empty life of factors which are essential to its fullness. For life implies effort ; and in its fullness is guided by conscious feeling and knowledge. These are implied and guaranteed by the creative activity of the Ground and of the individual will-centres which the Ground calls into existence. There can thus be conceived a continuous element of "newness" in the universe, yielding ever fuller and deeper modes of experience. More love—most assuredly ; but also—more life. "I came that they might have life, and have it more abundantly"—this utterance from the mystical Gospel supplies a more human and natural goal for the process than that of a completed, changeless, timeless love, that has no Becomings, and therefore no object to be attained, no hope of expansion. To call an unchanging state of love "perfect," or "absolute," does not satisfy some of the deepest intuitions and cravings of our nature. While I admit, then, the essential truth of the positive element in M'Taggart's speculation, I hold that, by itself, it is incomplete. Far more satisfying to me is the concept of a Personal Being, everywhere and always active, Who projects Himself in eternally creative power, and accomplishes a growing purpose.

To argue that the goal of the process is not equilibrium is not to argue that effort must always be painful. The problem of evil may arise from the conditions necessary to the process in which we ourselves are immersed ; but it may not be necessary to every process. The birth of the spirit in our existing order is accompanied by suffering and sin, by "groanings which cannot be uttered." But there is no ground in science or in philosophy for thinking that its birth may not, in some better universe, be peaceful and joyous. Nor are the experiences of peace and joy alien to the experience of a continuous Becoming—may we not even venture to say that without continuous Becoming they would lose their zest and cease to be themselves ?

PERSONAL IMMORTALITY

An objection may be raised that if there is a succession of processes, our personal existence may be merged, or dissolved, in the new orders that are to succeed our own. But if we have reason to believe that the goal of our cosmic process is the evolution of Persons, such an objection falls to the ground. The Creator would be defeating His own purpose if the results of the process were to be lost. Moreover, we may reply on general grounds that the attainment of full personality is a result of so peculiar a character that it is eminently fitted to persist in all successive processes.

Even from a purely physical point of view, the conformations now established will have their share in determining the constitution of such periods of integration as Herbert Spencer imagines will follow on the disintegration of the present order. How much more may we infer that the peculiar phenomena of personality will have a place as permanent elements in a universe which is not ultimately physical, but psychic and spiritual through and through ? And further, if there is

continuity of purpose in the series of processes, the persistence of the purpose implies the persistence of elements that are of paramount value in embodying and in advancing that purpose.

An individual has been defined as " a conscious form of the activity of the Ground." This expresses the core of my contention ; and it carries with it a strong suggestion of the persistence of the individual through and beyond the process in which he makes his appearance. The great difficulty is change—Becoming. But within the sphere of our own experience we find that constant change is not inconsistent with the persistence of the conscious centre. There is the constant miracle of the " new " in each of our individual lives ; and the result is, not a loss of the consciousness of " self," but an expansion of it—a growing content.

The death of the body is by no means subversive of belief in immortality when once we grasp the spiritual nature of the process. Were we confined to physical categories, the difficulty would be formidable—though even then not conclusive ; for as the embryo-speck gathers round it a body adapted to its environment in the physical process we know, so, as an indestructible whorl in ether, it might gather round it a body fitted to changed environments. But we are not confined to physical categories. We have thought of the individual as a centre of the will-to-live, and have considered the potentialities which actual experience teaches us are inherent in such a centre. The disintegration of a certain bodily manifestation of those potentialities is an event on the physical plane, and does not touch the psychic mode of existence which we call " will."

Taking a broad view of the problem we may say, with Renan, that the world-process aims at the development of spirit. But a primary condition of this development is liberty ; and liberty, again, can only exist in con-

sciously free personal agents. Nature, then, is not a slave, or a mere instrument executing orders given to it from without. It is a " parcel " of the divine energy which wills, feels, and thinks. And the centres in which the ideal comes to be consciously grasped are not evanescent products like bubbles on a stream, but embody and fulfil the secret and meaning of the Whole. And thus the Cosmos itself, because it is what it is, ensures the continuance of the free personal agents which it develops, and of which, indeed, it essentially consists.

THE END OF THE PROCESS

The process can only come to an end when all its potentialities are actualized ; that is to say, when all the " centres " it contains have been completely developed, and have been harmonized in a perfect society. The process, thus completed, may then serve as a starting-point for a still higher process, a new creation. As Browning has finely put it in his " Paracelsus " :

All tended to mankind,
And, man produced, all has its end thus far :
But in completed man begins anew
A tendency to God. Prognostics told
Man's near approach ; so in man's self arise
August anticipations, symbols, types,
Of a dim splendour ever on before
In that eternal circle run by life.

The only word on which I would comment here, by way of reservation, is " circle." No doubt this is justified by the teachings of the hero of the poem. But for our cosmological speculations, it suggests too strongly the idea of a recurring fixed cycle. If we substitute, for our own purpose, the word " spiral," the passage may be taken as a splendid description of the trend of the cosmic process, and of the goal to which it aspires.

CHAPTER IX

SOME FINAL THOUGHTS

How? Why? Whence? Whither? Such were the questions—insistent, momentous—with which we set out. I have attempted to meet them. The great problems they raise have been squarely faced; cursorily indeed, but sufficiently for the building up of a definite world-view. I have kept as close as possible to facts and to direct inferences from them: I have accepted the more authoritative of the teachings of science; I have not neglected the "reasons of the heart." I have, I trust, emphasized the main leadings of the facts of experience in such a way as to justify a reasonable faith in the spirituality of the cosmic process, and a reasonable hope that the outcome of the process will satisfy our deepest cravings and our most cherished ideals.

How? Not by immediate fiat, but by process: by growth, development, the maturing of an immeasurable purpose.

Why? In order that an environment might be provided in which centres of the will-to-live might have a training-ground for developing into Persons, who, as socialized moral agents, should be perfectly harmonized and united in a perfect society.

Whence? From the uncreated Ground of all Being, Who, as a living, loving, purposeful Person, detached, as it were, a "parcel" of Himself, so that it might have a relatively independent existence, and by free, spontaneous self-determination enrich the sphere of Being.

Whither? Onward, stage by stage, until the process has reascended to its Source, and is in absolute accord

with the purpose of the creative activity which projected it.

The argument has been from the known to the unknown. As astronomers inferred the existence of an unknown planet, Neptune, from the motions of a known planet, Uranus; so the inference has been from the character and the trend of the process which is known to the nature and purpose of the unseen creative Ground. Under penalty of disloyalty to the dictum *ex nihilo nihil fit*, I have inferred that the Self-existing Source of the process must be at least as rich in content as are the phenomena presented in the entirety of our experience.

I have contended that the time-series is not an illusion, but a genuine development: that we have not an eternal Now, with a static universe, but real succession which allows of progress in a dynamic universe. And I have shown that the apparent contradiction between this doctrine and the *ex nihilo* dictum is dissolved by recognizing in the Source a creative activity akin to, though far transcending, that of human creative art and invention. In this power of spontaneous initiative we find a solution of the problem of the "new," in distinction from the changeless completeness of an "Absolute."

A WORLD IN THE MAKING

The concept at which we thus arrive is that of "a world in the making." Creation was not a definite event happening at some time in the life of the Creator, after the lapse of a past eternity of solitary existence; it is an outcome of creative activity that is coeternal with the Being of God Himself. Hence it is that:

The hills are shadows and they flow
From form to form, and nothing stands;
They melt like mists, the solid lands,
Like clouds they shape themselves and go.

Hence it is that the Cosmos as a whole moves on. In the heavens, galaxies and systems are seen in every stage, incipient, far advanced, dissolving. The stupendous vision is not such stuff as dreams are made of: it is stimulated by touch with a real though changing process which has a self-existent Ground.

The end of the process is being attained by a long series of "efforts" put forth by centres of the will-to-live—centres which owe their existence, individually, to direct acts of creative power, but which, collectively, by their interrelations and their relations to the Supreme Will, make up the universe of our experience. Existence as a whole, therefore, is psychic, spiritual. The so-called material is simply its lowest mode, or plane. It is a foundation for subsequent stages which expand and realize its implicit powers and virtues. God being thought, will, love, the world which manifests Him must be essentially the same. And this fact invests the smallest phenomena, material or other, with dignity and meaning. Each has its place in a spiritual whole, an immense process, which is to find its fruition in "the manifestation of the Sons of God."

SPIRITUALIZATION OF MATTER

Even now we can see signs of the gradual spiritualization of matter. It is becoming the servant of our higher nature. Consider the body of a really great and good man. It has its place in his total experience; it declares its needs and imposes its conditions. But it is made to minister to functions of reason, sensibility, imagination, moral sense, which are removed by a vast gap from the functions of the body on the purely material plane. And thus it is that spirit is ever asserting its inherent right to rule and guide. Matter is not abolished: it remains the basis; but it is taken up, transformed, sublimated, in the higher stages of the process. A

picture by Raphael is but a further manifestation of the cosmic trend that evolves the rose: the brain of a Newton, the emotions of a St. Paul, are but higher grades in the process that builds the cells of the hive and gathers the chickens under the mother's wing.

And so, too, with laws of Nature. Seemingly inexorable, unalterable, external to ourselves, they are factors in a moral order. They become increasingly means to the development and expression of freedom. The inherent spontaneity of the process (Bergson's *Élan vital*) is proved by the fact that it develops beings who come to know themselves as free spirits—who feel that they are moving on to a plane of being where the secret of the will-to-live is found in the will-to-love.

MELIORISM

Our cosmology is not only largely in accordance with reason and feeling—it is also intensely practical. To use the favourite phrase of the pragmatists—"it works." It regards Nature as working out the purpose of a Person: Nature is, as it were, the child of the Creator, and inherits the qualities of the Parent. We gain thus a firm basis for belief in the possibility of the improvement of the world by human effort. The tendency of the process is sufficiently clear to enable even agnostics and purely scientific evolutionists to profess a gospel of Meliorism. Taking the facts as they are, without further speculation, these negative thinkers declare that individuals can "consciously do something to increase the sum total of human welfare, present and future"; and they profess that this belief, even though standing without theoretical or speculative support, can "inspire ardent and prolonged endeavour." If this be so, it seems to me impossible not to go on to further speculation—Why is the constitution of things thus framed?—What are the implications? And I venture to maintain

that the gospel of Meliorism is unconsciously Theistic. But at any rate it is manifestly of indefinitely greater power when we are consciously able to give it such a basis as that provided by our cosmology. And further, on a Theistic basis, the gospel of Meliorism is far more rational; for it does not stop short at the bare facts, but trusts itself to the inferences that naturally and immediately follow from the facts.

FAITH IN THE FUTURE

Faith in the future, if it is to be solidly founded, must be faith in the Ground of Being. Can we trust ourselves to anything that is not consciously purposeful? Until we take this step, Meliorism cannot be a genuinely working creed. But when the step is taken, faith in the future can then ennoble character and kindle generous hope: it can cure selfish individualism and make brotherhood a reality: it can foster social hope and provide driving-power for social ideals. The reason why a Theistic creed has such a manifold potency is easy to be seen. For when we are persuaded that the ultimate Source is spiritual, then we cannot but anticipate that spiritual unity and harmony are the destined goal of the world-process. Each stage in turn serves as basis for, and is absorbed into, that which succeeds it. The process is one of perpetual creation which leads ever to fuller life and richer environments.

Let it be observed that the process does not simply work up old materials, nor bring about better adaptations to an existing and unchanging environment—it goes beyond the given, and creates new values—it transforms, transmutes, transcends. Its very complexity often blinds us to its production of what is genuinely new. It induces some thinkers to go so far as to deny the possibility of real progress. To dispel such an illusion, nothing is more convincing than a study of the growth

of social ideals. Under all the miseries and imperfections of our modern civilization can be discerned the growth of a new spirit—a wider and nobler humanitarianism—a deepening and an expanding of the social consciousness, accompanied by a stronger assertion of the dignity and worth of the individual.

The new spirit leads us to busy ourselves, not only with the alleviation of evils on a small scale (though these are not forgotten), but strives to evolve a truly catholic sociology which is shot through and through with social hopes universalistic in their range, and plainly tending to social solidarity. When we dive beneath the surface of the social movements that characterize our era, and reach the strong grip of the main current, we realize that we are being carried along by a force against which no party or class interests can successfully struggle. And what is this force but the inherent and spontaneous trend of the world-process? Behind this is the vivifying and unifying creative activity of God, fostering the development of Persons, and drawing them together in closer bonds of brotherhood. The advance is slow and tortuous, but it is real. Humanity, says Proudhon, is like a rope-maker, who gets to the end of his beat by walking backwards. This was only too true of primitive man. It is less and less true as man becomes a self-conscious agent, a purposeful selector, a son in the Father's house.

THE CHRISTIAN CHURCH

All practical ideals should lead to association among those who are inspired by them. If they cannot succeed in establishing communities which embody and promulgate them, they have but small survival value. For life in communities fosters strong convictions, develops common sentiment, and gives definite scope and aim to what would otherwise be vague and sporadic. Now the

Christian ideal is based on the concepts of the Fatherhood of God and the brotherhood of man. The Fatherhood is supremely expressed in the Person of the Incarnate Son of God, Jesus Christ, Who is the bond to unite all nations and men in one comprehensive spiritual society, which St. Paul calls his "Body." We have here what is evidently the main conclusion of our cosmology—that its goal is the perfect union of perfected Persons in a perfect society.

My purpose, as I stated at the outset, is not here theological; and I therefore pass over the various points round which controversy rages when the subject of the Christian Church is broached. But I cannot refrain from emphasizing this striking agreement between the outcome of our chain of inferences from facts to Ground and the New Testament teaching concerning the purpose of the Incarnation. It is true that the outlook of the Church, as such, cannot be said to be cosmic. It deals with one side of life only—the spiritual. Its brotherhood is one which unites men as religious beings, not as scientists, politicians, artists, merchants, and the rest. But it claims to be the flower and crown of these varied activities, and to infuse a spirit which sets them in a new light and bends them to the attainment of the highest and noblest purpose. Under myriad forms, humanity struggles upwards to fuller life—the Church claims to point the way and to place humanity in close communion with the Divine Source of life.

It is the special strength of the Church (when she realizes where her true strength lies) that she is not a mere society of individuals, but a spiritual organism with a world-wide mission. She gave the earliest proof of her power when she breathed life into the decadent civilization that saw her birth. She wielded her first truly international influence when she linked up Greek and barbarian, bond and free, into a consciously apprehended unity, and inspired the faith that made possible the

careers and triumphs of the Western nations. In a strangely altered world, that mission is still before her. She must again show herself to be the divinely appointed inspirer of cosmic hope.

SPIRITUAL INTERCOMMUNICATION

We know, as a fact of experience, that we can operate on each other's minds through intermediary processes in the physical sphere—by gesture, speech, writing, and so forth. This fact argues organic connexion of the material and the psychical. If such intercommunication is possible on the lowest plane, how much more on the higher planes! There is evidence in favour of telepathy; there is the new psychology of crowds. There are suggestions, though as yet no evidence that I, for my part, deem valid, of intercourse between the living and the dead. But whatever may be the truth in these dimly apprehended modes of spiritual intercourse, there is no doubt whatever that the universe as a whole is pulsing with all manner of spiritual forces and influences which largely mould our lives and destinies. They permeate every part and stage of the world-process. They witness to, and are activities of, the creative impulse which initiated and sustains that process. The Spirit of God energizes always and everywhere; and thus the whole Cosmos is—

Bound by gold chains about the feet of God.

"The world that now is" forms but a vibration in the rhythm of eternity. God is the uncreated, self-existing Ground of all that Becomes. And since He is eternal, and since His love is eternal, so is that creative activity which pours around Him objects of His love. Inimitable in its brevity, its pregnancy, its comprehensiveness is that apostolic utterance which we have already found to contain the heart and secret of cosmology:

In Him, and through Him, and to Him, are all things.

APPENDIX A

THE NEW PHYSICS

Poincaré, at the conclusion of his review of modern physics, sums up thus: "The reader who has deigned to follow me in the rapid excursion we have just made through the domain of the science of Nature, will doubtless bring back with him from his short journey the general impression that the ancient limits to which the classic treatises still delight in restricting the divers chapters of physics, are trampled down in all directions." *

Professor Karl Pearson waxes somewhat sarcastic. After saying that he does not consider even the third revision of his well-known book, "The Grammar of Science," to be as full as it ought to have been, he proceeds thus: "Still, even in its present form the writers of elementary textbooks on dynamics might, if they would favour it with a perusal, learn that the time-honoured three laws of motion are not all that modern science has to say about mechanism, and that even schoolboys must sooner or later rebel against being told that 'a body remains at rest or moves in a straight line unless acted upon by a force,' or that 'mass is the quantity of matter in a body,' an absolute constant independent of its motion!"

Professor Cunningham, in the tenth chapter of the same work, writes thus: "The present crisis lies practically in this, that whereas through the greater part of the nineteenth century 'matter' was the concept which was looked upon as fundamental in physical science, of which there was a curious accidental property called electricity, it now appears that electricity must be more fundamental than matter, in the sense that our once elementary matter must now be conceived as a manifestation of extremely complex electrical phenomena." †

Poincaré, though the outlook does not daunt him, speaks thus concerning this substitution of the notion of an electric charge for that of a material mass: "The present hypothesis suffices for grouping known facts, and it will doubtless enable many more to be foreseen, while new successes will further increase its posses-

* "The New Physics," p. 322.

† "The Grammar of Science," 3rd edit., p. 356.

sions. Then the day will arrive when, like all those which have shone before it, this seductive hypothesis will lead to more errors than discoveries."

On the basis of such views as these, I feel myself warranted in affirming that the postulates of the old physics are not only hypotheses, but are under fire of destructive criticism.

APPENDIX B

MATTER AND ENERGY

The great step forward in modern physics is the substitution of the notion of an electric charge for that of a material mass. Matter, as Karl Pearson says, may be called "non-matter in motion." That is to say, apart from its motion, it is not matter at all.

Professor Pearson * quotes and comments thus: "We naturally turn to the little work named 'Matter and Motion,' by Clerk-Maxwell, one of the greatest British physicists of our generation. This is what he writes of matter: '*We are acquainted with matter only as that which may have energy communicated to it from other matter, and which may in its turn communicate energy to other matter.*' Now this appears something definite; the only way in which we can understand matter is through the energy which it transfers. What, then, is energy? Here is Clerk-Maxwell's answer: '*Energy, on the other hand, we know only as that which in all natural phenomena is continually passing from one portion of matter to another.*' All our hopes are shattered! The only way to understand energy is through matter. Matter has been defined in terms of energy, and energy again in terms of matter."

My own comment here is that evidently, apart from scientific dogmatism, there is considerable difficulty in distinguishing between matter and energy. Such a difficulty is bound to declare itself as physical concepts are more accurately determined and defined. But let us go further.

Karl Pearson† proceeds to comment on Professor Tait's attempts to grapple with the concept of matter. He points out that in one place of Tait's book on "The Properties of Matter" we have no less than nine, and in another no less than twenty-five definitions or descriptions of matter; "Yet so far from matter being

* "Grammar of Science," 3rd edit., p. 272. † Op. cit., p. 274.

rendered intelligible by all these statements with regard to it, Professor Tait himself writes: '*We do not know and are probably incapable of discovering what matter is.*' And again: '*The discovery of the ultimate nature of matter is probably beyond the range of human intelligence.*' . . . If our leading scientists either fail to tell us what matter is, or even go so far as to assert that we are probably incapable of knowing, it is surely time to question whether this fetish of the metaphysicians need be preserved in the temple of science."

My own comment is that if matter is unknown, save in so far as there is manifestation of energy, it suffices to deal with energy. Matter is a superfluous lagger on the stage, no less from the physical than from the metaphysical point of view. If it is argued that neither do we know what energy is, I join issue on the basis of direct experience. We know what it is to put forth effort. I have dealt with this aspect of the problem in the chapter on Will.

Another physicist, Ostwald, who has definitely espoused the doctrine that the ultimate reality is energy, writes thus: "The notion of matter was formed before that of energy was known; consequently constituents have been attributed to matter which essentially belong to energy. If we successively yield to energy those which belong to it, the notion of matter is dissolved more and more, and the extensities which remain are found to be factors of the extensities of the energies that are present." * Again,† he expressly declares that "in analysing matter, and in determining its constituents, we have come to see that it is a superfluous notion."

Let it be clear that to deny the existence of matter as a substratum, acted upon by energy, is not to deny the reality of the phenomena which we associate with the term "matter." It is only to call in question the complete validity of one of the hypotheses passed by physicists and others to describe and account for the phenomena. Karl Pearson says that "it is the great hope of science at the present day that hard and heavy matter will be shown to be ether in motion. . . . We shall find that our sense-impressions of hardness, weight, colour, temperature, cohesion, and chemical constitution may all be described by aid of the motions of a single medium, which itself is conceived to have no hardness, weight, colour, temperature, nor indeed elasticity of the ordinary perceptual type." ‡ The champion of

* "Energie," French trans., § 71. † Op. cit., § 80.
‡ "Grammar of Science," 3rd edit., p. 286.

Energy takes one step farther, and affirms that the ether is only a special manifestation of the one universal energy.

The following passage from Poincaré * will make clear the main contentions of those who hold that energy is the fundamental reality: "On this hypothesis matter would only be the capacity for kinetic energy, its pretended impenetrability energy of volume, and its weight energy of position in the particular form which presents itself in universal gravitation; nay, space itself would only be known to us by the expenditure of energy necessary to penetrate it. Thus in all physical phenomena we should only have to regard the quantities of energy brought into play, and all the equations which link the phenomena to one another would have no meaning but when they apply to exchanges of energy. For energy alone can be common to all phenomena."

APPENDIX C

CONSERVATION OF MASS

It is not necessary to give formal definitions of mass, as distinct from weight. Suffice it to say that "mass" represents the actual "material" in any given quantity of matter, irrespective of its position on the earth's surface, of its elevation above it or its depression below it. The question before us is—Must we affirm that this "material" is indestructible? The dominant doctrine answers in the affirmative, but cannot be proved; it is and remains a hypothesis. But there are now not a few physicists who deny this indestructibility. Doubts are arising even in the purely experimental aspects of the doctrine, so that Poincaré † can definitely acknowledge that it is no longer forbidden to regard the law of conservation as only an approximate law. Duncan ‡ writes thus: "Is the law of the conservation of mass the expression of an absolute truth? It does not seem so, at any rate in the case of radioactive bodies. We have learned that the mass of a corpuscle is dependent on its velocity, and this indicates that the mass of the radium atom before its explosive rearrangement would not be the same as the mass of the products of its disintegration, for the velocities of its corpuscles have changed." He

* "The New Physics," p. 67. † *Ibid.* p. 54.
‡ "The New Knowledge," pp. 249, 250.

gives instances where, in the case of solutions and freezings, capable experimenters have found differences of weight. Le Bon has written various papers on the dematerialization of matter, and in his book on the "Evolution of Matter" describes its birth, its evolution, and its end.* One of the theses which he endeavours to prove in his "Evolution of Forces" (one of the International Scientific Series), is this: "By the dissociation of atoms—that is to say, by the materialization of matter, the stable form of energy termed matter is simply changed into those unstable forms known by the names of electricity, light, heat, etc. Matter therefore is continuously transformed into energy."

Whetham in his book on "The Recent Development of Physical Science" (p. 282), expounding the electrical theory of matter, writes: "Matter, at any rate in its relation to other matter at a distance, is an electrical manifestation; and electricity is a state of intrinsic strain in a universal medium. That medium is prior to matter, and therefore not necessarily expressible in terms of matter; it is sub-natural, is not super-natural." And again (p. 290), "A more fundamental suggestion has been made by J. H. Jeans, who imagines that radioactivity may result from the coalescence of positive and negative electrons. On this idea, the energy of radioactive atoms is supplied by the actual destruction of matter."

On the basis of these quotations, I deem myself warranted in affirming that the doctrine of the conservation of mass is no longer accepted as unconditionally valid.

APPENDIX D

CONSERVATION OF ENERGY

There are physicists, we see, who affirm that matter, as characterized by mass, is decomposed into energy. We now proceed to ask whether energy is conserved. There are many who, even yet, will deny that doubts can arise in regard to this yet more fundamental postulate of modern physics. And certainly in the form in which it is now enunciated, it has a suppleness and illusiveness which make it almost unassailable. For though it was originally formulated in accordance with the principles of mechanics, it has

* See "Evolution of Matter," pp. 228–247.

burst its bonds, and participates in the freedom of modern physics—with consequent loss of definiteness and precision.

Here, however, is a paragraph from an exponent of the new physics: "Concerning the dictum of current science, that it is impossible to create or destroy energy, we ought to make the same provision as we did with matter, that while it may not be for ever and for ever indestructible and uncreatable, and while it may be even now suffering annihilation, *we* have no control over it. The doctrine of the conservation of energy is receiving some hard knocks nowadays, and whether or not it is weakened will be for the future to determine." *

The difficulties of the problem will be apparent if the following extract from a recent essay be studied analytically †: "When an elastic body collides with a fixed barrier, the motion of the body gradually decreases to zero and then begins to increase again in an opposite direction up to almost its original amount. At the moment prior to the rebound there is no motion in any direction; for before a reflected motion southward can begin, the incident northward motion must wholly cease. The motion in the world is not conserved in the sense of being the same in amount at every moment of existence. But energy is supposed to be conserved in just this sense. Hence energy is of two kinds, of which visible motion is one; and it is only the sum of the two phases that is constant. The energy which is not motion, but into which and from which motion passes, is called potential. Naturally, the nature of this invisible type of energy is a question of some interest. There are, I understand, three theories of its nature: (1) There is the theory that it is some sort of invisible motion (other than heat) of the particles of a body into which the molar motion is transformed. This appears untenable for the reason that precisely the same problem will necessarily recur in connexion with these particles, no matter how tiny they are made or how often we subdivide them. Two particles collide, lose their motions, and regain them in opposite directions. What becomes of the energy of these little motions during the moment of their redirection? (2) There is the theory that the kinetic energy of elastic bodies prior to collision passes at the moment of collision into nothing and comes out again from nothing quite fresh and unchanged in form or quantity. This is the view of potential energy that seems most in favour at present. According to it,

* Duncan, "The New Knowledge," p. 7.

† Montague, "Consciousness as Energy" in "Essays in Honor of William James."

potential energy is really nothing but potential. It is in no sense actual, but is just the sheer possibility of a certain quantity of motion. . . . (3) There is finally the older view that potential energy is stress or force ; that as such it is just as actual as the motion from which it has come, and into which it will pass ; that it is 'potential' only with respect to motion, and that motion might with equal propriety be called potential energy of stress."

From this passage we can readily judge how protean this conception of the conservation of energy has to be ! Not only is it manifested as light, heat, attraction, repulsion, and the rest—not only as electrical, magnetic, and radiant—but as "potential," and as motion. Add to these that, for thoroughgoing materialism and for energetics, mind with all its diverse activities, conscious and unconscious, must also be a mode of energy. When expanded thus, the dictum of the conservation of energy becomes equivalent to affirming that what exists, exists. That is to say, it ceases to have any special bearing or significance.

And now here is a passage from Le Bon, which will emphasize the difficulties of co-ordinating the potential and the kinetic modes of energy, and which also shows how that this scientist repudiates the doctrine of its conservation : "All these concepts of potential energy, unutilizable energy, degraded energy, etc., are the consequences of a confusion of ideas, according to which energy is a sort of substance of which the existence is as real as that of matter. This invisible entity, the secret mover of things, is supposed to circulate unceasingly through the universe by constantly transforming itself. This hypothesis was, moreover, necessary when matter was believed to be an aggregate of inert elements only able to restore the energy it received, and incapable of creating any. Something was indeed necessary to animate it, and it was that something which constituted energy." * Le Bon maintains that matter itself is the source of energy ; and that with the passing away of the necessity for a cause which should animate inert matter, there has also passed away the necessity for postulating its fundamental mode of existence. He continues thus : "Instead of imagining an unexplained power perpetually circulating through the world without even being exhausted, I say : At the origin of things there was condensed in matter, under the form of movement of its elements, an enormous but yet limited quantity of energy. This phase of concentration was followed by a period of expenditure of the accumulated energies, on which the sun and analogous stars have now entered. The

* "Evolution of Forces," p. 77.

disintegration of their atoms is the origin of all the natural forces now utilized. These atoms form an immense reservoir, but one which must inevitably exhaust itself. Then that which we call energy will, like matter, have disappeared for ever."

We find, then, that the new physics is opening out the way to a serious questioning of the validity of the doctrine of the conservation of energy. Lotze, even under the old physics, raised the standard of rebellion; in his "Metaphysics" he deals powerful blows against its claim to be a postulate—powerful, because he was a competent scientist as well as an acute metaphysician.* There is also a valuable discussion of the doctrine in Ward's "Naturalism and Agnosticism." † His general position is thus defined: "I will venture to say that not only does the principle of the conservation of energy tell us nothing about the quantity of energy in the universe as a whole, but that it does not even allow us to say that such quantity is an amount eternally fixed." Again ‡ he says: "All we have then is—first, the axiom that from nothing nothing comes; and secondly, the experimental determination of the quantitative equivalents of certain of those manifestations. From such data it is plainly impossible to prove that this *phenomenal* energy in the universe is fixed in amount. And this the physicists themselves are beginning to see more and more clearly, and frankly to admit. . . . We must remember, too, that this assumed constancy is only kept on its legs at all by counting in, first, the so-called *potential* energy, which is not actually energy at all nor mechanically of the same dimensions—capacity for work and capacity for capacity for work not being on a par; by counting in, secondly, *dissipated* energy, which is capacity for work for ever devoid of opportunity; and by allowing, finally, that in every material system there is an indeterminate amount of *latent* energy, of which nothing is known."

The trend of a certain line of speculation now declaring itself may be stated in a thesis of Le Bon's: "Energy is no more indestructible than the matter from which it emanates." § Of the system of which this thesis forms a part, Poincaré says: "An hypothesis of this nature carries with it consequences which ought in the highest degree to interest the philosopher, and we all know with what alluring boldness M. Gustave Le Bon has developed all these consequences in his work on the evolution of

* For a typical quotation see Part iii. chap. i. p. 98.
† Vol. i. pp. 170–175, and elsewhere—see Index.
‡ Op. cit., vol. ii. p. 76.
§ "Evolution of Forces," p. 16.

matter." * If Poincaré, though not quite convinced, can write thus, I am warranted in asserting that the doctrine of the conservation of energy is assailed by physicists, as well as by metaphysicians, and in claiming attention for its philosophical implications.

It is hardly necessary to point out that to deny the conservation of energy is not to deny the postulate of *ex nihilo nihil* ; for when we find the source of existence in a Personal will, we can understand, on the basis of experience, that the amount of energy may vary in accordance with the requirements of a rational purpose.

* "The New Physics," p. 289.

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